AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

INDEX, DECEMBER 1942 THROUGH DECEMBER 1944, IN BOOK 2

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

Formerly
AIR FORCES NEWS LETTER

DECEMBER 1942

WAR DEPARTMENT
HEADQUARTERS ARMY AIR FORCES
WASHINGTON, SEPTEMBER 6, 1942

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NO. 5-6)

PUBLICATIONS AND REPRODUCTION

AIR FORCE - Official Service Journal of the Army Air Forces

(This Regulation supersedes A.A.F. Regulation No. 5-6, November 1, 1941)

1. Establishment

The official service journal of the Army Air Forces is hereby established to be published monthly by the "AIR FORCE" Editorial Office located in New York City, with the following general purposes:

a. To disseminate unclassified information of technical and professional interest to personnel of the Army Air Forces and allied activities.

b. To advise Army Air Forces personnel of organization changes, revisions of policy, and items of general current interest.

c. To stimulate high professional standards and "esprit de corps" within the Army Air Forces.

2. Name

The official name of the journal is AIR FORCE. This name supersedes the former designation of AIR FORCES NEWS LETTER.

3. Field Relations

In the necessary relationships with the field:

a. Direct communication is authorized between the AIR FORCE Editorial Office and other Army Air Forces personnel, and vice versa, on matters of editorial content, circulation and distribution of AIR FORCE.

b. Station commanders will designate a suitably qualified representative as AIR FORCE correspondent, who will be charged with preparing and forwarding material for publication in AIR FORCE.

c. All Army Air Forces personnel will be encouraged to submit directly, or through their station correspondent, articles on any phase of military aviation or other allied subjects believed to be of general interest to readers of AIR FORCE.

d. All material published in AIR FORCE will be approved for inclusion and dissemination by the War Department, Bureau of Public Relations.

4. Circulation

It shall be the responsibility of the AIR FORCE Editorial Office to control and direct the circulation of AIR FORCE, and to prepare necessary instructions to station commanders and others responsible for bulk and individual circulation as may be required from time to time in order to make copies accessible throughout the Army Air Forces and allied activities.

5. Certification

Each issue of AIR FORCE shall bear the notation that it is printed with the approval of the Bureau of the Budget, Executive Office of the President, as required by Rule 42 of the Joint Committee on Printing.

By command of Lieutenant General ARNOLD:

GEORGE E. STRATEMEYER,
Major General, U.S. Army,
Chief of the Air Staff.

OFFICIAL:

WILLIAM W. DICK,
Colonel, A.G.D.,
Air Adjutant General.

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AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

Vol. 25 No. 7

DECEMBER 1942

A Smart Man's War

THIS is a smart man's war, being fought against a cunning and intelligent enemy. It is a fast moving war that forces all of us to keep abreast of day by day developments.

We must learn all we can, not only about our own job but about the other fellow's job. We are called upon to be specialists and at the same time achieve versatility. To accomplish this dual objective we must study new methods, new techniques, new roads to victory. Never before has the individual soldier been called upon to demonstrate such intelligence and resourcefulness, not only in the combat zone but also in the rear areas.

The best way to keep pace with new techniques of war is through the free exchange of ideas and information. When our air force was small—so small that we knew each other by name—this was a comparatively easy task. But now that we are building the largest military aviation machine the world has ever known, the job becomes increasingly difficult.

It is gratifying that out of a little service bulletin, which originated almost a quarter of a century ago, has come this modern service journal to foster the exchange of ideas within our expanding Air Forces. I encourage each one of you to read it regularly, and use it as a medium of expression.

At the close of the first year of war, I welcome this opportunity to congratulate you on a job well done, and at the same time impress upon you the need for even greater efforts for the task that confronts us. We have already conquered what seemed to be insurmountable odds. The future challenges us to rise to even greater achievement.

H. H. Arnold,
Lieutenant General, U. S. Army,
Commanding General, Army Air Forces

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FORMERLY THE AIR FORCES NEWS LETTER

AIR FORCE is printed each month by authority of Army Air Forces Regulation No. 5-6, Sept. 6, 1942, and with the approval of the Bureau of the Budget, Executive Office of the President. AIR FORCE is published by the U. S. Army Air Forces at the AIR FORCE Editorial Office, 101 Park Avenue, New York City; Tel., MUrray Hill 5-1951; Teletype No. NY 1-2530; Director, Major James H. Straubel, A.C. Direct communication with this office has been authorized on matters of editorial content, circulation and distribution of AIR FORCE. Army field publications may reprint from AIR FORCE without permission.

HERE'S HOW WE GOT THIS WAY

By Major Falk Harmel

Headquarters, Army Air Forces

YOUR service journal, AIR FORCE, looks brand new. Actually, it is an old standby which made its solo hop 24 years ago. And each year since, with but one exception, it has remained on "flying status."

The first issue, back on September 21, 1918, was a typewritten, mimeographed, four-page "Weekly News Letter." The name later was changed to Air Corps News Letter, then Air Forces News Letter. Now it is AIR FORCE. The format, likewise, changed. It remained a typewritten, mimeographed publication until July, 1941, when the varitype-multilith reproduction process was adopted. Flat color was added for the first time last February but the same printing method was used up to this issue.

As in aircraft, the designs and type names have changed, and range and size have increased. But a service journal becomes no more obsolete than plane types become obsolete. Thus, the complete and colorful history of the Air Forces for the past 24 years is to be found in the yellowed and worn copies of old News Letters, just as new issues will record the events that are to become Air Force history.

That first issue back in September, 23 years ago, the first page of which is reproduced below, began with this call for airmen:

"Irrespective of status in the draft, the Air Service (predecessor to the Air Forces—Ed.) has been reopened for induction of mechanics and of candidates for commissions as pilots, bombers, observers and balloonists, after having been closed except for a few isolated classes for the past six months."

The issue dated October, 1918, carries the story of the high flight made by Captain Rudolph W. Schroeder, who climbed to a record-breaking 28,900 feet over Dayton, Ohio. In the News Letter he wrote of his sensations before and after he resorted to his oxygen supply. Many important flights are recorded in later issues.

In 1921, a column in the News Letter was inaugurated under the title: "And I Learned To Fly From That." It was conducted on the principle of the old-fashioned Methodist experience meetings in which individuals bared their souls for their own benefit and for the benefit of others.

Following the first emergency parachute jump by Lieutenant Harold R. Harris in 1922, the News Letter regularly devoted considerable space to report the experiences of pilots who were forced to bail out. The News Letter became a sponsor of the now famous Caterpillar Club; whenever someone qualified for membership in this mythical organization by completing a forced jump, the News Letter kept a record of the event and published the new member's experiences for the edification of prospective members.

During 1922, 34 issues of the News Letter were published, but in succeeding years, due to the reduction in personnel, the annual output gradually dwindled until it was possible to publish only 21 issues in 1925, and from 15 to 17 issues in the years up to 1938. Ten issues were published in 1938, when, in October of that year, the News Letter was discontinued. It was resumed in 1935 as a semi-monthly and 24 issues were published annually thereafter until July, 1941.

Father of the Air Forces official service journal was the late Lieutenant Colonel Horace M. Hickam, in whose memory Hickam Field, Hawaii, was named. Colonel Hickam was in charge of the old Information Division of the Air Forces, which fostered the News Letter for many years, until 1922, when the Division and the News Letter passed over into the hands of Colonel (then Major) Ira A. Rader, one of the Army's pioneer airmen.

The names of officers who have had direct supervision over the News Letter include Lieutenant General H. H. Arnold, our Commanding General; Major General H. R. Harmon, Brigadier General LeG. Walsh, Colonel Henry W. Harms, Captain Burdette S. Wright, Lieutenant Colonel Ira Longanecker, Major General Walter R. Weaver, Colonel John D. Reardan, Colonel Harrison H. C. Richards, Brigadier General Robert C. Candee, and Colonel Arthur I. Ennis.

Other officers who have been closely associated with the News Letter include Major General Ira C. Eaker, chief of the U. S. Bomber Command in the European theater; Brigadier General Lester T. Miller, Colonels William H. Crom, David S. Seaton, Roland Birnn, Thomas M. Lowe and Ross G. Hoyt, and Captain Corley P. McDarment (Ret.).

THE FIRST NEWS LETTER

Sept. 21, 1918

DECEMBER *Brief*

THE COVER scene for this issue was selected as typifying what might be called the most dominating action of the Army Air Forces during the first year of war — high-level bombing with aerial gunners aboard our heavy bombers shooting down enemy interceptors. The cover is a reproduction of a painting by Walter Herrington, a New York artist who received his art training in Chicago and applied his brush in Texas before coming East.

MAJOR FALK HARMEL, whose history of the Air Forces News Letter appears in the adjoining columns, modestly omitted his own name from the list of men responsible for the development of the publication. Actually, Major Harmel has been more closely associated with the News Letter than anyone else during his 20 years and more at Headquarters. He now is attached to the Historical Section of Air Intelligence.

OLD BAG OF BOLTS came off the same production line as other B-24s but it becomes a definite personality in the article, Page 6, by Major Ben H. Pearse, a former Washington newspaperman on duty with the Air Transport Command. Major Pearse recently was assigned to the Command's Alaskan Wing.

AVIATION CADET ROBERT GIBSON, whose combat experiences as a radioman in the Southwest Pacific appear on Page 35, received his original radio schooling at Chanute Field, Illinois, in 1939. He now is training at Scott Field, Illinois, to become a Communications Officer. Cadet Gibson's story and the "Bag of Bolts" article were found to coincide at one point: the "other" plane referred to in the paragraph on Page 7 which describes how "Bag of Bolts" amazed the Dutch at Bandoeng, Java, is the same B-24 Gibson was in when Dutch anti-aircraft fire forced his pilot to return to Singapore (Page 35).

THE soldier at Scott Field who reported the loss of 16 teeth (his false uppers) following a hitch-hiked ride en route to camp, should find a double meaning in the security message on the back cover: "When You Open the Door . . . Shut Your Mouth."

WHEN four Colonels, three Majors and two Captains were given a preview of the AIR FORCE quiz which makes its first appearance in this issue (inside back cover), the top score was 90, the lowest 55 and the average 75.

THIS spot up front will be used to piece together odds and ends of the month, whether they be of the combat and training variety or of a more general nature.

For this issue it seems fitting that a few words be devoted to how the Air Forces News Letter became AIR FORCE and what AIR FORCE is all about.

In recent months the demand for News Letters far exceeded the supply. To meet this demand it became necessary to change our method of reproduction; redesigning of the journal fell right in line with the change. Hence this new format. The words "News Letter" were dropped from the title because they were outdated. That's the background.

AIR FORCE is published by the Army Air Forces for officers and men of the Army Air Forces. It will be made available to all Air Forces personnel within the continental limits of the United States—and by "all" we mean officers, enlisted men, cadets and students.

Sufficient copies will be furnished each Air Forces activity for all to read. However, bulk station shipments, not individual mailings, are our *only* method of distribution to the field. If you fail to see a copy check with responsible authority at your own field or installation.

At the outset, it isn't possible to distribute as many copies as we would like to overseas units without burdening our transport facilities. As much as we want everyone in the Air Forces to receive the service journal, it is far more important that you who are overseas get the maximum of guns and ammunition and plane parts and letters from home.

AIR FORCE is your medium for exchanging ideas and information pertinent to the operations of the Army Air Forces and pertinent to your own military interests. It is your medium for linking Headquarters with the field, one field unit with another, individual with individual.

We believe AIR FORCE should be fundamentally helpful, not merely informative and entertaining. But we think all three can be achieved by presenting material that is accurate, readable and adequately illustrated.

In our opinion, a good aviation story, factually sound, can always stand on its own feet; and we will try to give you good aviation stories. If, in addition, that story contains information that will be helpful to you as a member of the Air Forces, in some way help you fight the war—then we have accomplished something worthwhile. In AIR FORCE that is the objective we will keep shooting at.

We depend on you for the bulk of the material that appears in AIR FORCE, and for suggestions and criticisms. Your contributions do not have to be written in some "inimitable style"; write the article just as it comes easiest to you, or merely give us facts and points to be put across and let us do the rest. Remember that we prefer to run articles that appear under the by-lines of the authors and that we give credit to privates in the same size type we use for generals.

And now for some odds and ends.

DURING the raid on Dutch Harbor last June, Jap fighters stumbled onto an advanced Army airfield out in the Aleutians. Our land based aircraft, up on patrol at the time, immediately tore into the enemy.

Meanwhile, according to one of the sources for our Alaskan article in this issue, a big C-47 transport landed at the base with a load of cargo, the pilot not realizing what kind of a show was going on up above. As he cut the motors, the pilot turned to the co-pilot and pointed to the small winged objects hurtling across the sky.

"The boys sure do play hard, don't they?" he commented.

"Yeh," the co-pilot grinned, "if they don't look out somebody's going to get hurt practicing that way."

A moment later they froze in their seats. One of the "boys" had started down, quite obviously hurt. Their jaws dropped in unison when it got low enough for them to make out the rising sun insignia on the fuselage, and the familiar white star on the ship hot in pursuit.

"Well I'll be damned!" was all either of the C-47 men could find to say.

HEADQUARTERS is encouraging and intends making the fullest use of original thinking among Air Force personnel on tactical, technical and administrative subjects. C.O.s have been directed to encourage their personnel to develop and submit constructive plans, ideas and criticisms along these lines. They are to be submitted through command channels to the Assistant Chief of the Air Staff, Management Control, who will forward them for consideration to the proper Headquarters agency. The procedure does not apply to unpatented inventions, which are to be submitted as provided in AR 850-50, Dec. 31, 1943, as amended by Sect. 1, Circ. 248, WD, 1942.

(AIR FORCE will pay particular attention to original ideas from the field which improve the over-all effectiveness of the Air Forces; we intend, whenever possible, to publicize these ideas after proper clearance has been obtained at Headquarters.)

THIS technique was reportedly used by a German squadron in a recent attack on a convoy off the northern coast of Norway: Sixteen aircraft approached the convoy head-on at low altitude and in column until a point was reached two miles from the head of the convoy. From this point each attacking plane attempted to filter through the convoy columns singly at very low altitude. One captain in the convoy said each aircraft carried two torpedoes which were released singly from as low as 10 feet, and that the planes, after launching their torpedoes at the outer column of ships, proceeded through to the inner columns so low that his forecastle machine guns were firing downward at the attacking planes.

LUKE FIELD'S location in the Arizona desert makes it difficult to keep up with the daily newspapers, but the men at Luke miss little of the important news of the day. Twice daily a Public Relations Office representative jumps on a motorcycle, dashes around to field detachments and delivers news flashes taken from radio reports.

EXAMPLES of ingenuity are springing up throughout the Air Forces. We want to hear about more of them. At any rate, belated congratulations:

To Private Arthur W. Rodrick, Air Trans-

port Command radio operator, for rigging up a makeshift radio homing device by stringing wire from his grounded plane to a motor vehicle and thus guiding two storm-lost B-25s, unable to make radio contact, to a safe landing in a mountainous area in China during the monsoon season.

To the boys on a Pacific island who salvaged lumber from a wrecked ship, washed up on the beach years ago, to make an airplane hoist capable of raising a fighter plane almost as easy as if it were in a model hangar.

To First Lieutenant Lew Jordan, who needed an antenna base insulator in Aruba, couldn't wait for the regular supply ship, and used a soda pop bottle which worked to perfection.

To Harry T. McCormick, machine shop superintendent at the Minter Field subdepot, who has designed 25 separate jigs to speed up production and repair of aircraft.

JUST another reminder to check your rights and benefits if you carry accident or health insurance policies! Practically all accident and health policies contain provisions which exclude any coverage where the injured person is engaged in military service in time of war. You may be paying premiums on such policies (which you held prior to entering the service) and are receiving restricted or no coverage for these premium payments. Your insurance agent should be glad to give you all the information on your policies. If you haven't already done so, check with him for your own protection.

INFORMAL reports from Russia state that Soviet airmen have repeatedly used inland lakes as landing areas to make contact with their troops behind enemy lines. In summer months flying boats, not only light amphibians but heavier planes, have been used on these missions. With winter at hand, the Russians expect to continue this aerial supply line by using aircraft equipped with ski runners to enable them to land on frozen lakes.

WHEN flying in the Greenland area it will pay to have these points in mind:

In investigating strange fjords it is better to start from the ice cap side and fly seaward; in some fjords you can't turn around at the inboard end.

An ice cap is smooth near the crown and extremely rugged near the mountains. If forced down on an ice cap, stay with your plane to enable searchers to locate you more easily.

Radio ranges which run over the ice cap contain many multiples below 10,000 feet.

Skis and ski poles for each member of the crew should be carried on missions in this area. A Primus stove also should be taken along in the plane.

A .22 caliber pistol or rifle is much better to have along than a .45 in case you are forced down. Rabbits and ptarmigan (Arctic grouse) are the only game available in southwest Greenland.

Remember to carry the most protective dark glasses you can get. And don't forget the heavy, long underwear.

WHEN the Japanese were evacuated from the Seattle area a Jap printer walked out leaving a printing press in the basement of a building.

Lieutenant Lawrence A. Rogers, Special Services officer at McChord Field, heard about it and began dickering on prices. He finally bought the press for $1, with the proviso that he would move it out of the basement. The press, representing something like $500 in equipment, was loaded on a truck and taken to McChord.

Now, much of "Rip Cord," the camp newspaper, is printed on the former Jap press, and the cost of the weekly publication has been greatly reduced.

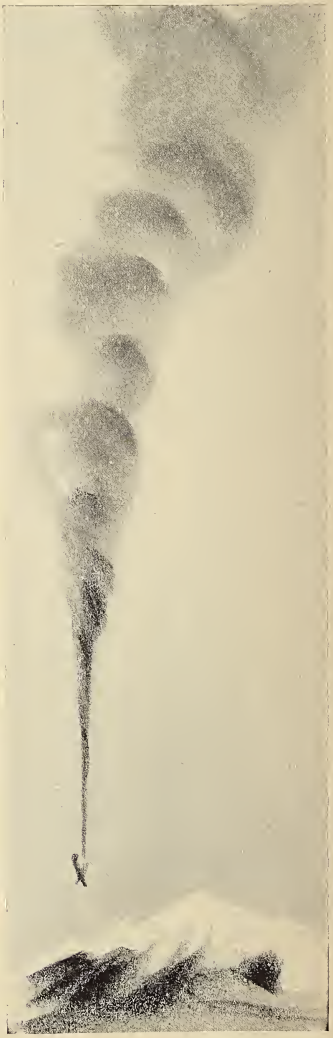
AN investigation of a recent crash showed that the pilot had deviated, contrary to specific instructions, from the authorized route of his mission. Since the death of this pilot was "not in line of duty and was a result of his own misconduct," all gratuities to which his beneficiaries were entitled under provisions of A.R. 35-1560 were withheld.

THE Russians report unofficially that German bombers under attack have been known to release small time bombs attached to miniature parachutes. These 'chutes, when swept up by air current behind the bomber's tail, endanger fighters which are pursuing the bomber.

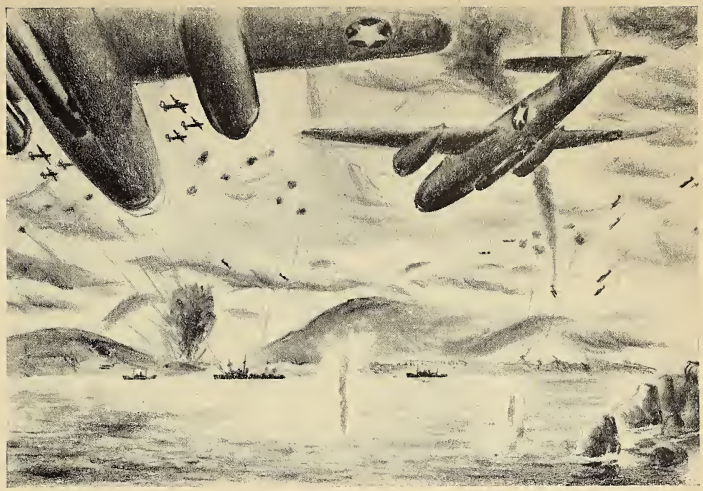
MORE R.A.F. SLANG . . . . "A black," something badly done; "bombphleteers," airmen engaged on the early pamphlet raids; "to be browned off," fed up; "in the drink," to come down in the sea; "fan," propeller; "get cracking," get going; "office or pulpit," cockpit of aircraft; "play pussy," hide in clouds; "quick squirt or quickie," short, sharp burst of machine gun fire; "sausage machine," pom-pom gun; "shot down in flames," severe reprimand; "stationmaster," C.O. of station; "tee up," to get ready; "touch bottom," to crash.

THE item in the Control Tower section of the August-September Air Forces News Letter concerning the Army of Occupation of Germany Medal should have pointed out that this award is authorized not for *all* veterans of the World War I, but for Officers, Army Nurses, Warrant Officers and Enlisted Men of the armed services who served in Germany or Austria-Hungary during the period from November 12, 1918 to July 11, 1923, inclusive.

Applications will not be submitted until the Medals become available. (Because of the metal used, they will not be struck until after the present conflict.) Until then, those who are entitled to it, may purchase and wear the authorized ribbon. For complete details, see W. D. Circular No. 176, June 6, 1942.—THE EDITOR.



ALASKAN OFFENSIVE



Fighting weather and Japs with our Air Force in the fog bound Aleutian Islands.

THE husky Air Force Sergeant counted out 12 lumps of coal from the gunny sack beside the G.I. stove and dropped the lumps strategically one by one on the little bed of coals. Then he peered through the flap of the tent, spat disgustedly at the whirling snow and stretched out again on the cot. The Sergeant seemed very much at home in this Aleutians outpost.

"It's as plain as the prop on a pea-shooter," he said. "I've got it all figured out. I say the Japs had big ideas when they tried to drop in on Dutch Harbor last June. Midway was a big idea, too, but I figure the Japs to attack Siberia before they try to invade the States. Even before Stalingrad their mind was on Siberia first of all.

"But before they try to take on the Russians they've got to protect their right flank. They've got to cut off the road for reinforcements from the States. The only way to do that is to cut off Western Alaska.

"Now, except for airplanes bringing in high priority stuff, the only way to supply Western Alaska is by boat, and the Japs have been fishing around here long enough to know that the shortest and best way to Bethel, to Nome and to all the other places on the western coast is by Unimak Pass, between Unimak and Unalaska Islands. So they figured by taking Dutch Harbor, on Unalaska, they could close the pass and bottle up all Western Alaska."

The Sergeant fished a cigarette out of his pocket and lit it. Hearing no comment from the other cots, he looked around to be sure his companions had not gone to sleep.

"Damned if I don't believe they could have done it, too, if they had knocked off Dutch Harbor," he went on. "There would have been a wedge a thousand miles wide between us and the Russians in this neck of the globe. And that wouldn't have helped any, believe me. The Japs could have gone ahead with any plans they had in Siberia.

"Only they didn't get Dutch Harbor. The Japs are smart and know a lot, but they didn't expect to run into any land-based planes as far out in the islands as they did last summer. There are lots of unsung heroes in this man's war, but for my money I'll take the guys in the B-26 that dropped the tin fish on the Jap carrier that day. When the Martin dropped that torpedo on the carrier deck, it was the last straw.

"A friend of mine was at the radio listening in at the time and heard the Jap pilots calling their flat top. 'Whereabouts, prease, gas veree low, onry 10 minutes gas,' them Japs were saying over the radio. 'Whereabouts, prease, onry five minutes gas.' Then it was 'onry' three minutes gas and my friend could almost hear them Japs plumping into the water one by one as they looked around for the landing deck they had taken off from to give the works to Dutch Harbor. Plop! Plop! Plop! Fifteen, twenty, maybe thirty of 'em. Maybe more; who knows?

"The pilot of that B-26 came back for another torpedo, cussing like hell because he didn't get the carrier the first time. Then he went back out there. The pilot was never heard of after that, but neither was the Jap carrier. I think he got the carrier like he said he would. Even if he didn't, I'm betting he scared it so far away it hasn't been around these parts since.

"Of course, it's no cinch to get the Japs out of Kiska. But they're on the defense at Kiska, while we'd be the ones on the defense if they were in Dutch Harbor."

The Sergeant rose to peer out through the tent flap again. A curtain of fog obscured the anti-aircraft emplacement on a knoll less than 50 yards away. He spat his disgust once more and went back to his cot.

This article was compiled from material submitted in informal reports by Colonel H. W. Shelmire, Headquarters, Army Air Forces; Major Ben H. Pearse, Air Transport Command, and Lieutenant George Bradshaw of this staff. Illustrated by Captain Raymond Creekmore.—THE EDITOR.

FIREWORKS opened up the third day of June along the sub-Arctic string of volcanic rocks that form the Aleutian Island chain.

The drone of Jap planes through the early morning mist silenced radios from Puget Sound to San Diego, even sounded an alert at the Panama Canal, but there was plenty of noise on the northeast corner of Unalaska Island.

The Japs came from different directions, five flights of three planes each. They swept down over Dutch Harbor and Fort Mears, strafing the streets at 500 feet, attacking anti-aircraft batteries which opened up with a volcano of fire. Anti-aircraft guns on the destroyers, a mine sweeper, a Coast Guard cutter and an Army transport joined in as they got under way in the harbor. A Jap plane drew a black smudge across the sky and disappeared behind Priestly Rock. A PBY taking off from the bay was shot out of control by a Zero and crashed on the beach. A Jap fighter hit by ack-ack burst into flames and dove screaming into the harbor.

Five minutes later four Jap bombers appeared flying high and dropped high explosive and incendiary bombs. One raised an oil tank more than 100 feet in the air and another started a fire near a warehouse. A gunner on one of the ships in the harbor brought down a bomber which trailed black smoke until it disappeared behind the hills. It was all over in 20 minutes.

Jap reconnaisance planes returned at noon but if their cameras were any good they showed all the fires were out and the same number of surface ships in action as before the attack. The enemy came back the next afternoon with 18 carrier-based bombers escorted by 16 fighters, but it was his final appearance in the vicinity of Dutch Harbor.

Only a poet could do justice to the story of the aerial slugging match that has been going on ever since.

(Continued on Page 27)

Old Bag of Bolts

By Major Ben H. Pearse

Air Transport Command

She was blessed with an assortment of names. To many she was "Old '76." Some called her "Red Cap" and others "The Gravy Train" because she carried so many important personages to the four corners of the earth. But the name "Old Bag of Bolts" seemed to fit her best.

Officially she was just A.C. Serial Number 40-2376, a B-24 airplane with a history all her own, as can be vouched for by the scores of men, women and children whose lives she saved—ferry pilots in the North Atlantic, combat crews and refugees in the South Pacific.

It is anybody's guess what the enemy might have called her. Old Bolts seemed to have a charmed life while she was trucking precious cargo all over the Pacific combat zone in a dangerous game of hide and seek with Jap aircraft during those first hectic days of war.

Squat and lumbering on the ground, she would waddle up to the head of a runway like a duck out of water. But once her ponderous landing gear was tucked away, she was a creature transformed—maneuvering her big hulk with the lightness of a toe dancer.

When Bolts was turned over to the Ferrying (now Air Transport) Command one day last year, months before Pearl Harbor, she had already cut her eye teeth on dozens of missions. She had reached middle age for a plane of her type, but it was just another case of life beginning at 40.

As a Ferrying Command ship, Bolts had no regular run. Home was any place she plumped her wheels down. And it was here, there and everywhere on short notice. Her crews had uncalled-for laundry all over the globe. Their baggage included fleece-lined clothing and boots for the Arctic, shorts and mosquito boots for the tropics.

Bolts knew what it means to labor along through the heavy fog and mist of the North Atlantic burdened down with tons of ice. On the South Atlantic run her paint blistered under the equatorial sun; her motors choked through dust storms and wallowed through thunder squalls where St. Elmo's fire played about the leading edges of her wings and zigzagged eerily across the windshield.

Her crews ate quinine instead of candy as she shuttled back and forth from Washington to Cairo over steaming African jungles and shimmering desert sands. Now and then they would zoom her low and let her chase herds of giraffes to break the monotony. With little more than a wrench and screwdriver to work with, mechanics would jump out almost as her wheels touched the ground, then sweat in the torrid shade of her wings to change a cracked exhaust brace or broken stack, replace an oil valve, change spark plugs, service the oleos and clean the strainers.

So thoroughly did the factory workers who put old Bolts together do their job and so thoroughly did her own mechanics sweat that her pilots were able to report at the end of each leg of each flight, under the heading of "Mechanical Difficulties," the sweet monosyllable "None."

Not that Bolts didn't have her moments. Back before her South Atlantic and South Pacific adventures, for instance, on that trans-Atlantic round trip to the United Kingdom. She held ferry pilots as passengers and the trip was routine until two hours out of Montreal on the return hop.

From landfall on the coast of Labrador there had been intermittent, moderate icing of the rime type. Then things began to happen. Without warning, the rime crystals changed to hard clear ice, formed from large, supercooled rain drops. Bolts was laboring. Second Lieutenant C. W. Dean, co-pilot, turned on the de-icer fluid for her props and the boots on the leading edges of her wings and tail, but the altimeter needle kept sinking. First Lieutenant James W. Anderson, pilot, pushed forward the throttles as the needle continued to turn slowly downward. At last, when the throttles were wide open, the needle stopped. Dean and Anderson breathed a sigh of relief.

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"Will it help? Hell yes, it will help."

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"Sir, you are now over Labrador flying straight for the Atlantic Ocean. A course of 169 degrees should get you to LR in about two hours."

Lieutenant Anderson nodded without turning around and bore down heavily on the wheel. The ailerons, elevators and rudder on old Bolts were frozen again, as they had been intermittently for the past four hours, but after some tugging at the controls Bolts slogged around like an obedient dray horse and turned her pug nose toward LR. Pulling back on the controls would not raise her nose an inch, but her four motors chugged on through the darkness until she settled herself gently on the mile-long runway at LR.

No sooner had Bolts rolled to a stop than goggle-eyed ground crews began arguing whether her coating of ice—two to three inches broken off by the de-icer boots —weighed one, two or three tons.

But Bolts had tougher flights than that before her. Her instructions, to be exact, came in a recorrected copy of Operations Order No. 163. That was December 5,

The Saga of a faithful old B-24 that asked no quarter while making history during the early days of the war

1941. She subsequently covered nearly 150,000 miles on the grind—it was really one continuous flight—and her engines hardly ever cooled until the very end. Time for her 25, 50 and 100-hour checks flew past unnoticed, all because of the scribbled note that fluttered in the radio operator's hand as he dashed out to Bolts at Trinidad.

"Pearl Harbor attacked by Japanese at 0728," the note read.

The name of Ambassador William C. Bullitt headed the list of passengers as old Bolts roared out over the Caribbean. But famous names were soon to become commonplace with Bolts. At Cairo, on that hop going over, a party of high-ranking officers boarded her for an emergency mission to Australia. Then she was loaded down until her sides were about to pop with ammunition and scores of other items badly needed in a hundred spots in the East Indies.

Maps were scarce, good ones, anyway. First Lieutenant Ben Funk, the pilot, picked up some information from a Dutch pilot at Karachi, but he still wasn't prepared for that short runway at Calcutta. It was marked "1,000 yards" on his map—barely enough for a B-24 loaded until her tires bulged—but actually it was only 760 yards. Somehow, with plenty of brakes, Lieutenant Funk and old Bolts managed it—with 100 feet to spare. To get off that runway, Bolts had to leave some gas behind.

On to Rangoon, which the Japs were bombing daily, then to Bandoeng in Java, where the Dutch made quite a fuss over Bolts. They had never seen anything like her 28-ton body close up before. In fact, she was such an unfamiliar sight that an Allied plane looking very much like her had been fired on by Dutch anti-aircraft less than a half hour before. But Bolts came in without difficulty. (The other ship went on to Singapore.)

At Soerabaya, the next day, Major General Lewis H. Brereton and Major General George H. Brett were taken aboard old Bolts for a 10,000-mile inspection trip, 3,600 miles of it in a one-day flight from the west coast of Australia to Sumatra.

There was great need in the Indies for maintenance personnel to service the B-17s that had come in. Bolts was ordered to go from Australia up into the Philippines and bring out as many key maintenance personnel as possible. That was late January. The ground crews in the Philippines had been removed from Luzon to a secret airport on Mindanao. Japanese-controlled Davao was only 100 miles away. It was a ticklish job, flying in at night, picking up the crews, and getting out unseen. Bolts had no armor, no self-sealing tanks, and only a few machine guns for protection.

STAFF Sergeants Leo Zulkowski and Frank Sayko worked all day on Bolts, checking and rechecking for the afternoon takeoff. The motors had long since passed the 400-hour mark. From Australia to Mindanao and back was 3,600 miles, almost all of it over open water. Things had to be right.

Old Bolts made the trip without incident, although Lieutenant Boselli had to change course five times to avoid Jap-controlled areas. During the last lap of the flight, Captain Hewitt T. Wheless, who had flown every mile of the coast in his B-17, stood between Lieutenant Funk and First Lieutenant Charles Bowman, co-pilot, to guide them to the secret airfield. Bolts brought out 25 crack mechanics in her bomb bay.

About a week later Bolts was off for Rangoon with General Sir Archibald Wavell aboard. The Japs had raided a field nine miles from Rangoon a half hour before her

(Continued on Page 18)

". . . she sat down in the water a few hundred feet off shore. After more than 600 hours, her motors had sputtered for the first—and last—time."

Old Bag of Bolts

By Major Ben H. Pearse

Air Transport Command

She was blessed with an assortment of names. To many she was "Old '76." Some called her "Red Cap" and others "The Gravy Train" because she carried so many important personages to the four corners of the earth. But the name "Old Bag of Bolts" seemed to fit her best.

Officially she was just A.C. Serial Number 40-2376, a B-24 airplane with a history all her own, as can be vouched for by the scores of men, women and children whose lives she saved—ferry pilots in the North Atlantic, combat crews and refugees in the South Pacific.

It is anybody's guess what the enemy might have called her. Old Bolts seemed to have a charmed life while she was trucking precious cargo all over the Pacific combat zone in a dangerous game of hide and seek with Jap aircraft during those first hectic days of war.

Squat and lumbering on the ground, she would waddle up to the head of a runway like a duck out of water. But once her ponderous landing gear was tucked away, she was a creature transformed—maneuvering her big hulk with the lightness of a toe dancer.

When Bolts was turned over to the Ferrying (now Air Transport) Command one day last year, months before Pearl Harbor, she had already cut her eye teeth on dozens of missions. She had reached middle age for a plane of her type, but it was just another case of life beginning at 40.

As a Ferrying Command ship, Bolts had no regular run. Home was any place she plumped her wheels down. And it was here, there and everywhere on short notice. Her crews had uncalled-for laundry all over the globe. Their baggage included fleece-lined clothing and boots for the Arctic, shorts and mosquito boots for the tropics.

Bolts knew what it means to labor along through the heavy fog and mist of the North Atlantic burdened down with tons of ice. On the South Atlantic run her paint blistered under the equatorial sun; her motors choked through dust storms and wallowed through thunder squalls where St. Elmo's fire played about the leading edges of her wings and zigzagged eerily across the windshield.

Her crews ate quinine instead of candy as she shuttled back and forth from Washington to Cairo over steaming African jungles and shimmering desert sands. Now and then they would zoom her low and let her chase herds of giraffes to break the monotony. With little more than a wrench and screwdriver to work with, mechanics would jump out almost as her wheels touched the ground, then sweat in the torrid shade of her wings to change a cracked exhaust brace or broken stack, replace an oil valve, change spark plugs, service the oleos and clean the strainers.

So thoroughly did the factory workers who put old Bolts together do their job and so thoroughly did her own mechanics sweat that her pilots were able to report at the end of each leg of each flight, under the heading of "Mechanical Difficulties," the sweet monosyllable "None."

Not that Bolts didn't have her moments. Back before her South Atlantic and South Pacific adventures, for instance, on that trans-Atlantic round trip to the United Kingdom. She held ferry pilots as passengers and the trip was routine until two hours out of Montreal on the return hop. From landfall on the coast of Labrador there had been intermittent, moderate icing of the rime type. Then things began to happen. Without warning, the rime crystals changed to hard clear ice, formed from large, supercooled rain drops. Bolts was laboring. Second Lieutenant C. W. Dean, co-pilot, turned on the de-icer fluid for her props and the boots on the leading edges of her wings and tail, but the altimeter needle kept sinking. First Lieutenant James W. Anderson, pilot, pushed forward the throttles as the needle continued to turn slowly downward. At last, when the throttles were wide open, the needle stopped. Dean and Anderson breathed a sigh of relief.

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SQUARE PEGS IN SQUARE HOLES

By Lieut. Allen C. Rankin, Jr.
SOUTHEAST AIR FORCES TRAINING CENTER

Here's how psychologists use scientific heckling to select the bombardiers, navigators and pilots of the Army Air Forces

In steadiness test, Cadet Lionel Humphries holds a pin-sized stylus in a nail-sized hole as the instructor attempts to rattle him. If the stylus touches the hole, it records a demerit.

YOU ARE SITTING in a room with a half dozen other cadets, each of you facing a small steel plate with a tiny hole in the center. In your hand is a stylus. You must place the point of the stylus in the hole, remembering that each time the stylus touches the edges of the opening an electric charge scores one point against you.

The examiner speaks in a quiet voice:

"Are you ready now? Insert the stylus."

Electricity spits through the room. You are certain you touched the edges a dozen times. You wonder how the other fellows are doing. The examiner is about to speak. This time he shouts.

"All right. Try it again!"

More electricity.

"You!" the examiner yells—and you are certain he means *you*. "How do you think you will ever be a flier if you can't do a simple thing like this without getting nervous? You'll never make a flier. You couldn't be a buck private!"

His words bite a little and the stylus shakes even more. The examiner pulls a lever. A horn honks. Another lever. A buzzer rasps. Above this added confusion, the examiner screams:

"Look at you! How steady do you think you'd be under machine gun fire? What would you do in real combat? Live bullets!"

Then he hits the racket "jackpot." A hunk of metal which he has released from the ceiling comes thundering down on a loose piece of sheet iron. It sounds as if all hell has broken loose. You almost lift the steel plate with the stylus.

"What are you jumping for?" bawls the examiner. "Does a little thing like that make you nervous? Now, remember this number: two, four (honk, honk . . . toot, toot . . . crash!), five, nine, eight (buzz, buzz . . . honk!) seven, four (CRASH! . . . toot, toot, honk) eight!"

The room becomes suddenly quiet and the examiner purrs: "Now write down that number, please."

You ponder for a moment. What number? But you put something down on paper and the test is over.

This whole procedure appears to be more than a trifle on the crazy side. Actually, it is a sample of the mental obstacle course which noted psychologists have devised to help provide a short cut in earmarking aviation cadets at Army Air Force Classification Centers. Not all of the course is as wacky as this noisy test designed to judge nervous stability, but part of it is.

Scientific heckling, an outgrowth of long and arduous experimentation, has become an important feature of the classification process now used daily in the centers at Nashville, Tennessee; Kelly Field, Texas, and Santa Ana, California. Cadets are exposed to devices ranging from "nightmare" games of Chinese checkers to revolving pirate's gangplanks; from wingless, tailless airplanes to ingenious noisemakers set off at just the proper moment to have a maximum nerve-shattering effect. And the entire procedure is designed to help predict:

1. For research purposes—whether a cadet is likely to succeed or fail as an Army flying officer.

2. For practical purposes—whether a cadet should be trained as a pilot, bombardier or navigator.

The old question was: "Can you pre-determine whether a man can fly?" The new question: "Can you pre-determine which one of three intricate jobs this cadet should have?"

In two days the psychologists accomplish what formerly required months to learn about applicants for flying jobs.

The ideal test of whether a cadet should sit at the controls, plot a course with a compass or drop bombs on a target would be to put him through the entire courses for each job and select his best effort. But in addition to a cost of more than $100,000 per man, such a procedure might outlast the war with the first class of students.

Science does the job with tests and gadgets based on simple logic. As one expert in the field expressed it: "If a man can flip a button into a water glass with a paper clip, it is a fair indication that he can also play a nice game of tiddle-de-winks."

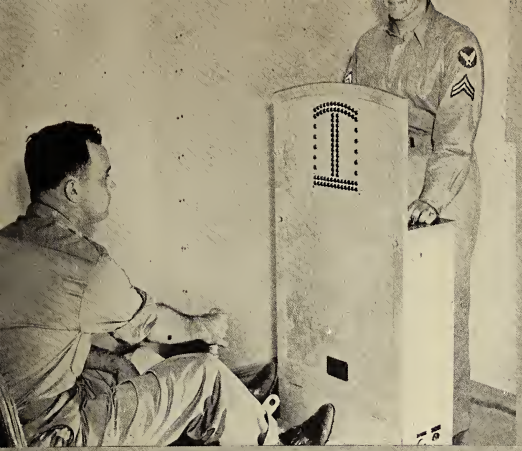
The tests devised by the psychologists have "face validity"—actually resemble parts of the job to be done—no matter how much the average cadet thinks otherwise as he struggles through the classification procedure. Tests now in use were first tried on almost 1,000 cadets, and each test proved itself. The cadets were scored on a given test and then watched closely as they went through their training. If an overwhelming number who had done well on the test did proportionately well in assigned courses, and, similarly, if the number who failed the test, did poorly in the courses, the test was pronounced sound for this phase of classification.

IN ADDITION to the stylus-in-the-hole test for nervous stability, here are some typical hurdles a cadet must take as he goes through the classification center:

On the first day, the cadet is given a written examination, meted out parcel by parcel. He finds himself in the same room with about 100 others, each sweating over papers in individual stalls designed for the purpose. The written tests range in subject matter from mathematics, to vocabulary, to map reading. The papers invariably are turned in with misgivings.

Jittery, the cadet shows up the next day and pushes into a small room with six or eight others. He sits at a long table and is baffled by two boards confronting him, side by side. In one board is inserted a maze of small wooden pegs; in the other are holes.

"When I give the word," explains the



Lights flick on this complicated testing board in different combinations in the reaction time test, and Cadet Milan Law is trying to bring the red and green lights into straight lines by coordinating the movements of his hands and feet on the dummy joystick and rudder bar.

Another reaction time test requires students to manipulate four buttons according to a combination of flashing red and green lights, so as to extinguish a white signal light at top of the panel. A clock records total seconds needed to put out the white light 50 times.

examiner, "you will transfer the pegs in one board to the holes in the other in the shortest possible time. Stop immediately when I say stop. The number of pegs you have removed from the board will determine your score."

This simple but effective test measures hand and arm dexterity. As in all similar tests, a few trial runs are made so that examiners may be sure the cadets understand just what is to be done.

There is another peg board test. In this one the pegs are square, with round tops, half yellow, half black. The objective is to pick up the peg, turn it completely around and replace it in the same hole. The cadet is told to turn as many pegs around as he can in a specified time. This test measures the finger dexterity needed in performing many flying duties.

The name of the next one places a cadet on guard. It is called the "Discrimination Reaction Time" test. A group of square boards stand perpendicular to the table. Five lights stare from each board. Four of the lights, when flashed on, will be either red or green; one, white. Four small levers, resembling the turn-on-turn-off switch of a radio, stick up from the table at the foot of the board. The cadet is told which switch to pull when certain combinations of red and green lights flash on. When he pulls the right switch the white light, which also shines on the board with every combination, will go out. The cadet is scored on the time it takes to put out the white light in 50 trials. An operator at the end of the table flashes on different light combinations to confuse him. A clock at the end of the table records the total time. (Average time for some 50 trials is about 49.3 seconds.)

The contraption in the next test is a "panic" for the average cadet. The machine, called the Serial Reaction Time Apparatus, consists of a low seat for the subject, an airplane rudder and a joy-stick. A pattern of red and green lights pops out on a board. By coordinating the movement of the stick in his hand with the movement of his feet on the rudder bar, the cadet brings the lights together in the quickest possible time. Not until all the lights line up will they click off, then a new pattern of lights appears. The idea is to make the lights click off as often as possible in a given length of time.

After the cadet has done what he considers his worst—which probably isn't too bad in reality—he is his own greatest problem. A self-cultivated crop of jitters makes him a fit subject for the heckling test which features the stylus-in-the-hole nightmare.

The psychologists are not dogmatic. They are the last to argue that their decisions be considered final in all cases. A cadet who feels he did not get a square deal in being classified is entitled to an interview with the commanding officer. If, in this interview, sufficient reasons are brought out as to why the decision should be reversed, it may be done at the officer's discretion.

Psychologists are quick to admit that their prediction average will come closer and closer to the bulls-eye of perfection in direct ratio to the betterment of their equipment.

Psychological research is so far ahead of the equipment with which it has to work that many psychologists also must be inventors, draftsmen, carpenters, metal workers and machinists to make practical application of their own brain children.

This war jumped the gun on psychology as on everything else. A research program, following a comparatively leisurely pace, was underway at the old classification center at the Southeast Training Center Headquarters,

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Latest type of bi-manual coordination testing device is demonstrated above by Cadet William A. Denniston. The students below are taking the "turn peg" test, which measures the nimbleness and control of their fingers.

"We'll Go Back Some Day..."

By Captain Robert B. Hotz

Air Transport Command

Airmen of the Dutch East Indies, with one campaign behind them, rebuild an air force in the U. S. for a comeback at the Japs.

UNDER sunny Mississippi skies the Royal Netherlands East Indies Air Force is training for a comeback against the Japanese. It is a long way from the Jackson Air Base to the Southwest Pacific, but to these intrepid Dutchmen who survived the battle of the Indies last winter, it's the first step toward home.

With new American equipment and hundreds of recruits who escaped from the Indies, the Dutch colonials are rebuilding their shattered squadrons. Officers and men of the former army and navy air forces are now merged into a single separate air force commanded by Lieutenant General L. H. Van Oyen. Under his leadership they are preparing to carry on their battle to regain the lost colonial empire of Holland.

Backbone of this new Dutch air force are veterans of the Indies campaign who now serve as instructors in the Jackson training program. They will lead the new squadrons back into the battle of the Pacific.

Typical of these veterans and the battle they waged are three young flight lieutenants who fought the Japs last winter with inadequate equipment against desperate odds. Lieutenant Fritz Den Ouden engaged Zero and Messerschmitt fighters of the Japanese navy in an antiquated Martin B-10 bomber. Lieutenant Henry Simon, a fighter pilot, took on Zeros and Nakajima bombers in a Brewster Buffalo. Lieutenant Herman Arens met similar opponents in the same Lockheed Lodestar commercial plane he had flown for the Royal Dutch Air Lines in peacetime. The Martin B-10 was once the very latest in bombardment aircraft, but that was back in 1934 when Lieutenant General H. H. Arnold won the Mackay Trophy for leading a squadron of them on a survey flight from Bolling Field to Alaska and return. Seven years later, for leading a flight of B-10's against the Japs, Lieutenant Den Ouden won the King William's Order, highest Dutch military honor, and the Dutch Distinguished Flying Cross, personally awarded him by Queen Wilhelmina.

The B-10's flown by Lieutenant Den Ouden's squadron were souped up to do 210 miles per hour. They carried a .30 caliber machine gun fore and aft and two 1,100-pound bombs, but were without armor plate and leak-proof gas tanks. With this old equipment Lieutenant Den Ouden's squadron sank 13 Japanese vessels, including two heavy cruisers. Arrayed against these Dutch bombers were 300-mile-an-hour Zeros and ME-109's armed with two 20 mm. cannon and four machine guns.

"Against the armament of enemy fighters even a formation of B-10's had little chance," Lieutenant Den Ouden said recently, recalling his encounters over the Indies. "When we were attacked our flight scattered and ran for it. We tried to get down just above the water and zig-zag to throw off the Jap fire. When we were that low it was hard for Zeros and ME-109's to dive on us without crashing. If they caught us higher they usually made a rear attack. We tried to wait until the instant before they came within range. If you pulled the B-10 into a sharp stall at exactly that moment the Zero would go sailing by overhead and you could get a shot at him from underneath with your nose gun. We got several Zeros that way."

LIEUTENANT DEN OUDEN'S squadron was mobilized at Bandoeng, Java, on December 2, 1941, after Dutch naval patrol planes had reported large concentrations of Japanese naval vessels in the South China Sea. Six days later these fleets attacked the Philippines and Malaya. By December 4, Lieutenant Den Ouden's squadron was established in a secret air base in Borneo ready for business.

Lieutenant Den Ouden went into action on Christmas Day over Kuching, capital of Sarawak, where Japanese troops were landing. His flight straddled a big ammunition ship with three 1,100-pound bombs from 12,000 feet.

"The sea seemed to explode under our bombs," Lieutenant Den Ouden recalled. "Many barges clustered around the big ship vanished in the explosion. Our plane was rocked by the blast. We knew it must have been an ammunition ship we hit. After the smoke cleared away there was only wreckage on the water. When we got back to our base my bombardier discovered a Japanese sailor's cap jammed in the bomb bay doors. It must have been blown up into our plane just as the bomb bay doors closed.

"Three days later over Miri in Sarawak we sank a large transport with two 1,100 pounders. I was watching the ship burn and roll over when the rear gunner shouted 'enemy fighters taking off from Miri.' There was no regular airfield there, but we learned later that Japanese fifth columnists had prepared a secret base on a large cocoanut plantation owned by Japanese nationals.

"Five Zeros hit us. My left wing man went down in flames. I saw two men bail out as the bomber plunged out of control. Then I heard the rattle of bullets against the metal skin of my plane and the staccato of my own guns in action. My rear gunner shouted, 'I got one,' but immediately I heard louder explosions and smelled the odor of bursting 20 mm. shell from the Zero's cannon. I finally got into the clouds and lost the Zeros."

Lieutenant Den Ouden's wife, Tillie, was a Dutch Red Cross Nurse at the base where his squadron was stationed. On December 28, after waiting hours for Lieutenant Den Ouden's flight to return, she finally saw one of the three planes limping in.

"The tail was almost shot away," she said. "Pieces of the skin were shot from the fuselage. Only one motor was working well. There were bullet holes all over. I didn't see how anybody could be alive in-

(Continued on Page 38)

In obsolete B-10s like this, Dutch fliers made combat history.

THE SCOPE OF PRECISION BOMBING

By Colonel Edgar P. Sorensen

Assistant Chief of Air Staff, A-2

THE bombing airplane is an offensive weapon with which we can reach the enemy at vital points where no other weapon can reach him. It hurdles mountains and defies bad weather. It by-passes concentrations of enemy defensive ground weapons. It beats off enemy fighters by expert use of its own defensive armament. It goes over the top — envelops the enemy in a vertical plant.

The bomber's offensive fire has taken the form of missiles of many varieties—principally high explosive and incendiary bombs. It gets its maximum return—its greatest effectiveness — by scoring direct hits. Near misses may cause some damage; far misses may not even annoy the enemy.

Our goal is the destruction of those things which make it possible for the enemy to carry on the war against us. Such objectives, be they aircraft factories, steel mills, aluminum plants, oil refineries, transportation equipment or shipyards, must be made useless to the enemy. This requires destruction and destruction demands hits by properly selected munitions.

Thus we see the necessity for precision bombing—bombing that will get hits, and hits that will cause destruction. Some targets can be destroyed best by large demolition bombs. In others, more extensive destruction will result from a larger number of smaller bombs spread over a greater area.

Fusing is very important. Penetration is sometimes necessary, either into strongly constructed buildings or into the ground to damage water and gas mains, power conduits and subway facilities. In other cases, an instantaneous explosion at the surface will do great damage by blast and fragmentation effects. Still other targets may best be attacked by incendiaries causing destruction by fire.

Many targets cover rather extensive areas. This is true of many steel mills, of tank farms for fuel and oil, and sometimes aircraft factories. Yet, in most targets there is a vital spot, which, when destroyed, renders the major portion of the remainder inoperative or useless. It is true that many bombs which miss the vital spot will do great damage in the vicinity. Nevertheless, we must hit the vital spot and destroy the usefulness of the complete establishment to the enemy.

Thus, again, we must bomb by precision methods. We cannot annoy the enemy to death. We must make it *impossible* for him to carry on the war against us.

Asking for absolute precision bombing is asking a great deal. Release of bombs must be made from a correct point in space so that after many thousands of feet of vertical travel and many hundreds of feet of horizontal travel they will find their mark. To assist us in determining this release point in space, quite precise bombsights have been developed.

Like all precision instruments, the bombsight must be handled by specially and highly trained individuals. The bombsight is necessary as an aid to determine the correct point of release but it must be handled with skill. It is improper and uneconomical to place precision instruments in the hands of operators who are unable to get the full value out of them.

A well planned bombing mission includes many elements. The targets selected must be such that their destruction will cause a maximum of disability to the enemy. To make its success relatively certain, much consideration should be given the size of the force sent on the mission and the tactics of its employment.

Economy of force is always a vital consideration.

Repetition of a mission should not be necessary, at least not until the enemy has spent much time and effort in rebuilding the destroyed facility. We must expect losses of aircraft and crews in practically all important missions. Too small a force or improper tactics, necessitating immediate repetition, only add to our losses. Enemy opposition can be applied effectively against our missions only to a certain numerical extent. If repetition of our missions is necessary, much of that same enemy opposition can be applied against us on each such repetition.

The success of a bombing mission requires not only precision bombing at the target but thoroughly coordinated teamwork by all members of the bombing crew and unit. Every man has his function to perform. The loss or failure of any crew member jeopardizes the success of the mission. The plane must be properly handled. Its engines and other equipment must function properly. Communications must be ready for instant use. Defensive gunners must be prepared to protect the entire mission. The navigator must find the target and the bombardier must see that his bombs hit it.

The number of sorties accomplished or the tons of bombs dropped do not provide the criterion upon which successful bombing can be judged. Hits and the destruction of the enemy's facilities are what count.

The value of bombing accuracy can hardly be overstated. Every reduction of average bombing errors by one-half multiplies the bombing effectiveness by four.

Errors may be reduced by two major means. The first is by providing the most highly trained bombardiers and bombing teams. This factor is of extreme value under all circumstances. The necessity for it cannot be over-emphasized, nor can too much effort be expended to accomplish it.

The second means of reducing errors is in the selection of the best bombing altitude. It is inevitable that bombing errors increase with altitude. Bombing errors at 20,000 feet are about twice what they are at 12,000; therefore, the effectiveness is reduced to one-fourth. The advantage to be gained by lower altitude bombing, however, must be balanced against the possibility of aircraft and crew losses due to anti-aircraft opposition both from the ground and in the air. Again, however, proper tactics will provide coordinated attacks which will neutralize such opposition.

In addition to the proper selection of targets, the designation of a proper force and the prescription of proper tactics and technique, there is the matter of proper bomb selection, the proper fusing of such bombs, the best use of existing weather conditions, the employment of fighter escort where practicable, and the planning of other coordinated missions which will cause a maximum dispersion of available enemy fighter opposition.

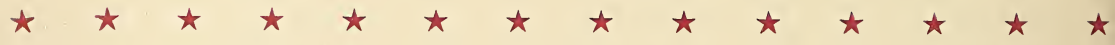
These precision bombardment principles are being translated today into widespread daylight raids by the Army Air Forces. Smashed railroad centers, shipping yards, war factories and other military objectives in Axis territory bear witness to the potency of precision bombing, which the Army Air Forces has come much closer to mastering than any of our enemies.

The excellent results of the Air Forces' bombing raids on Nazi-held Europe are a tribute both to the men and the unsurpassed planes they fly. But the best crews and the best planes in the world are a mere luxury if they cannot hit the target.

One plane that hits its target may be worth a hundred planes that fail.

How to Keep Well in the LIBYAN THEATER

Brigadier General David N. W. Grant
THE AIR SURGEON



With the successful prosecution of the war effort depending so heavily on the health of every officer and enlisted man, AIR FORCE *has requested the Office of the Air Surgeon to prepare a series of articles on health conditions in the various theaters of operation, with emphasis on precautions vital to maintaining physical fitness. The following article is the first of the series.—THE EDITOR.*

DISEASE is no respecter of individuals. Neither gunner, pilot nor commanding officer is immune. Illness can strike just as squarely at the heart of combat operations as the most devastating man-made weapon of war.

The medical service of the Army Air Forces has established certain standards of field sanitation and set forth immunization programs applicable to different parts of the world. Yet, these measures will suffice only if the individual takes every possible personal precaution.

An example of the many ways in which the individual may safeguard his health in theaters of operation can be drawn from a study of health hazards encountered in the Libyan Theater and of suggested methods to combat these hazards.

The health of troops living and operating in the Libyan Theater is generally better than can be expected in more normal terrain. Except in actual combat, however, the bulk of the troops do not remain in the desert proper but visit inhabited areas nearby, where native populations predominate, sanitation is poor and communicable diseases are prevalent.

Principal health problems in north Africa are related to the procurement and use of water. Excessive heat and lack of moisture in the atmosphere increase water consumption in an area where water is almost nonexistent.

Except for water treated under the supervision of Army personnel, the water in this area must always be considered potentially contaminated with various organisms capable of causing such diseases as typhoid fever, dysentery, schistosomiasis and guinea-worm infestation.

Personnel ordered to this area should know one or two emergency methods of treating drinking water. If the facilities are at hand, water boiled from three to five minutes, or water treated with either halazone or the more satisfactory calcium hypochlorite, the same material used in Lister bags (F.M. 21-10), should be used. Remember, when using a chlorine method of water purification, much more chlorine will be necessary if the water is turbid or contains large quantities of organic material.

Of great importance is a thorough knowledge of the practical uses of water. The amount available is restricted and in forward areas each man may be allowed as little as one or two gallons a day. Moreover, with the exception of the larger coastal and river towns, only limited amounts are obtainable in the rear.

One or two gallons of water is a very small amount when it has to be used for all purposes: drinking, cooking, bathing, shaving, and brushing the teeth. Then, too, if forced down on the desert, you may have to get along on a quart a day. This can be done for four or five days without serious consequences.

THE necessary conservation of water under such circumstances can be accomplished by protecting the supply before consumption, and by conserving water after ingestion by limiting, as much as possible, fluid loss by perspiration. It will pay to form the habit of drinking small amounts of water slowly. Nearly all water that is consumed rapidly is thrown off in excessive perspiration and thus wasted. Small sips from the canteen moisten the mouth and throat and alleviate the first cravings for water. Chew gum if available but cut down on the smoking for it accentuates the desire for water. Moreover, become accustomed to salty water, for you may have to add salt to your supply, usually three or four tablets to a quart, to make up for body losses due to perspiration. You will find that desert well water is usually very salty. Incidentally, strong unsweetened tea is an excellent liquid to carry in the canteen. Boiling the water in preparing tea guarantees the purity of this refreshing and thirst quenching drink.

Personnel should learn to differentiate between sunstroke and heat exhaustion. Either is easily prevented if the early symptoms are recognized by the individual or his companions.

Early signs and symptoms of sunstroke are headache, dizziness, irritability, dry hot skin, and seeing objects such as red or purple spots before the eyes. Sunstroke victims have a high temperature, and immediate steps should be taken to reduce this temperature to prevent death. Disrobe the victim in the shade. If no other shade is available, rig some clothing for a tent. Sponge the body with water and provide a cool drink of water. Sunstroke victims should be taken to a medical officer or ambulance as rapidly as possible.

Heat exhaustion and heat cramps are signalled by muscular cramps, pale, moist, cool skin, dizziness frequently accompanied by vomiting, weak pulse, dilated pupils, and shallow respiration. Place the victims in the shade, and lower their heads. They are in need of salt, so give them small amounts of fluids continuously such as hot tea or coffee to which large amounts of salt have been added.

Even though water is restricted in this hot, dry area, it is still necessary to bathe as frequently as possible. The skin-folds between the toes and in the crotch and armpits must be kept clean in order to prevent fungus infections such as dhobie itch. After bathing, dry the parts well, and apply powder—army issue foot powder is excellent for such use.

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Impostors in Uniform

Catching up with the phonies who masquerade in military dress to ring the bell socially and financially.

By Lieut. George F. Bradshaw

CONSIDER now the case of Major X. First information on him comes from a private who was having dinner one night with friends in a New York restaurant. The Major was at the bar.

The Major had been at the bar too long. Otherwise he might not have come over and stood before the private's table.

"Soldier," he blurted, "what are you doing here?"

The private stood up. "Just having a bite to eat with some friends, sir," he replied.

The Major stared. "What outfit do you belong to?"

The private told him.

The Major shook his head. "I don't believe you," he said.

Where the scene might have gone from there is anybody's guess, but just then a couple of the Major's friends hauled him away.

Now the private had good connections. The next day he told his Colonel what had happened. The Colonel, being a moderate man, hit the ceiling. "You find out who that guy is," he said.

So back to the restaurant went the private the next night. The Major was again at the bar. The private knew the owner. "Jack," he asked, "who is the Major?"

Jack was full of information. The Major was a famous flyer. "And look," Jack exclaimed, "he has just been given the Distinguished Flying Cross."

Sure enough. There was the D.F.C. ribbon.

So the private figured he'd forget the whole thing. After all, why make an issue of a situation in which the principal is something of a hero. Besides, maybe the Colonel would consent to forget, too. The Colonel did.

Another scene took place in New York's most famous night club. Our Major X was again at the bar. The discussion centered on phonies who wear uniforms.

The Major reached into his pocket and pulled out his identification cards. "Here's one way you can always tell," he said authoritatively. "Just ask to see a man's papers. A real officer has these with him, and he's got them with him *all the time.*" For emphasis, he pounded the bar.

The Major lived high, wide and handsome. Last Fourth of July, for instance, he was a special guest in a test run up the Hudson to West Point in a Navy PT boat.

And, he had become, quietly enough, a Lieutenant Colonel, letting himself in for the usual congratulations and a quantity of free drinks.

But silver leaves weren't enough. Two weeks later he appeared with the eagles of a Colonel. At that, even his night club companions became curious.

"How come?" they asked.

The new Colonel was almost bashful in telling about it. "I was down in Washington and George (Major General Harold L. George, Commander of the Air Transport Command) said I was doing such a heluva swell job that he took a pair of eagles out of his pocket and told me to wear them."

Some of his companions gagged at that one. This was just too much. It wasn't long before the Provost Marshal's office was notified. The Colonel was turned over to the proper authorities.

After the Colonel's "record" had been given a thorough going over, it was obvious that he had no connection with the Air Forces whatever. The Colonel was just a guy who liked a pretty uniform. He had been a commercial photographer, which explained his ability to forge identification papers.

IT'S HAPPENING all the time. The Provost Marshal's office and the F.B.I. are picking up fake officers by the dozens. And a good proportion of them wear Air Forces insignia. The wings, it appears, are romantic.

Every phony has his reason. A few of them are crooks, but a good proportion get dressed up just out of vanity. When you are a bona fide member of the armed service and know how tough it is to keep your official papers straight, you wonder how anybody would dare to pull a fake. But plenty of them do.

Not all of them aspire to be officers. Last summer, out in Hollywood, an enlisted man stepped into high life for a few weeks.

"Stepped" isn't quite the right word. He came in on crutches.

One night at a radio broadcast, he asked if he could be introduced to Cecil B. DeMille. Mr. DeMille was delighted, asked him to come around to Paramount Studios next day and watch shooting.

So he arrived, crutches and all. He watched Mr. DeMille for awhile and then was taken to the set of Miss Claudette Colbert's new picture.

He made an instantaneous hit. He was a nice-looking boy, modest, and wounded, of course. His story was that he had been struck in the head by a piece of shrapnel seven months before, and had been paralyzed by the blow. He was then waiting to be sent to Johns Hopkins Hospital for an operation which, by a slim chance, might relieve the pressure and permit him to walk again.

He wouldn't talk of his troubles. He just smiled and said, "Well, it's a war. Somebody has to get hurt." The whole cast and crew fell for him. He became their personal hero.

He had his picture taken with Miss Colbert, with Fred MacMurray, and other stars. He made a recording of his voice and Miss Colbert's. He was wined and dined. He came back day after day and sat quietly on the set.

Our hero let more than a week elapse before he got to work. Then one day, after

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Important

The unauthorized wearing of the uniform of the United States Army or any distinctive part of it is punishable by fine, imprisonment, or both, under Section 125 of the National Defense Act.

A soldier who has reasonable cause to believe that a person wearing the uniform of the Army is an impostor should not attempt to arrest such suspected impostor, but should report the facts to his company commander, the Military Police, or, if neither of these is available, the local police.

Myron C. Cramer

MAJOR GENERAL,
THE JUDGE ADVOCATE GENERAL.

IMPOSTORS

(Continued from Page 13)

he had left, the director of the picture approached the cast. "Look," he said, "we've got to do something about this. While our young friend was hitch-hiking into the studio this morning, he lost his wallet, either dropped it or had it stolen. There was $170 in it, everything the boy had in the world."

There was proper audience reaction.

"Now," said the director, "let's take up a purse. We can all put in a little bit and never notice it." It was agreed.

But Miss Colbert wondered. Why was the Army permitting a wounded hero to hitch-hike all over town? And why, if he got hit in the head with a piece of shrapnel, didn't he have some sign of a scar?

When she thought aloud she got some scornful looks from the rest of the cast. That Colbert, they said, here's a guy who's been risking his life to defend us and now she . . .

So Miss Colbert made out a check for a sizeable amount and put it in the hat. "All right," she said. "Only do one thing. Before you give him the money, call up and find out about him."

Her suggestion was carried out. The fellow had given an address to which the photographs and recording were to be sent.

A landlady answered the telephone.

"Him?" she said, "why he left here two weeks ago to go down to Long Beach to get a job. Wounded? What are you talking about —He's never even been in the Army."

INNUMERABLE cases could be cited. A "Major" in Chattanooga. A "Ferry Pilot" in Newark. A "Flying Tiger" in Los Angeles.

And two Air Corps "Second Lieutenants" in New York. These last two were pretty ambitious fellows. They had been draftees, both stationed at Fort Bragg; one had gone over the hill in December, 1941, and the other in May of this year. They met in a bar one fine evening. Each was terrified that the other would learn the truth about him. Each was then wearing an officer's uniform.

But they managed to arrive at an understanding, and from that time on they teamed up. They had a merry six weeks before the F.B.I. caught up with them.

They left a trail of $1,100 worth of bad checks and unpaid bills in hotels and night clubs in New York and New Jersey. They just missed buying a car with an $1,800 bad check, because they could not obtain a priority. They had stolen identification cards from a Lieutenant and a Captain.

One of them met a dancer in Albany, and from Newark sent her a $154 diamond ring he had purchased with a rubber check. On the side, he stole war savings stamps from his mother.

The F.B.I. caught up with them in Atlantic City.

So it goes. War and expanding armies bring out the uniforms. And a few of the boys get them the easy way. Too easy.

A B-26 flies safely with one motor stalled and the blades feathered.

Single Engine Operation

By Lt. Col. J. B. Duckworth

COLUMBUS ARMY FLYING SCHOOL

WHEN a pilot is flying a twin-engine plane and one engine fails, he must remember above all else:

NEVER SACRIFICE SPEED FOR ALTITUDE!

You can lose control of heavy, high horsepower, twin-engine airplanes from nothing but loss of airspeed. If a rate of 30 or 40 miles per hour over the minimum single engine operating speed is maintained, no loss of control can result. The ship can be banked steeply *into* the dead engine and be as solidly controlled as though both were in use.

The amount of airspeed necessary over the minimum single engine operating speed depends upon the altitude in which the aircraft is placed (such as a steep bank), which engine is down (thereby controlling torque), the amount of aileron being used, and other factors. For instance, if the airplane is stalled with one engine operating only, the torque of the other engine tends to "throw the airplane over on its back" and more and more rudder control is necessary to prevent this tendency. As the airplane approaches the complete stalling speed, full rudder is finally being used and when the rudder control becomes inadequate, the torque of the operating engine will tend to throw the airplane over. The use of aileron in such a situation involving low airspeed does not help but rather increases the tendency of the airplane to go over.

Therefore, when you experience the loss of one engine, the first thought should be adequate airspeed. If near stalling speed when the one engine fails, it may be necessary to *cut* the operating engine rather than allow it to pull the airplane over on its back.

If any altitude whatever is available, your first move, rather than open the good engine, should be to shove the stick forward to gain adequate airspeed. Once that is achieved, you can satisfactorily go through proper single engine flying procedure.

If just off the ground, you must have minimum single engine operating speed. With such, you can by quick action climb the plane on one engine. But in such action your primary thought must still be airspeed.

Thus, a cardinal rule, in the event of an engine failure, is to put forward the wheel until sufficient velocity is obtained.

Once adequate speed is achieved, the pilot's next problem is directional control. To obtain this with safety—*use only the rudder*. Use of the ailerons at low speeds tends to put an increased drag on the inside wing, which only adds to the difficulties caused by engine torque.

Consequently, the second cardinal rule is to *forcefully use the rudder to obtain directional control, leaving the aileron alone.* If adequate airspeed under the conditions obtained already has given full control to both aileron and rudder, this rule ceases to be important, but inasmuch as the danger spot occurs at lower airspeeds the rule should invariably be adhered to.

Only after adequate airspeed and directional control are secured should a pilot go into the normal single engine operating procedure—namely, opening of the pitch control, opening of the good engine, trimming of the airplane, and so forth.

Admittedly, a pilot experienced in single engine operating procedure will react automatically and will obtain airspeed and directional control practically at the same instant that normal procedure is adopted. However, a great deal of practice is necessary for accomplishment of all operations at once. And the slightest failure to gain sufficient speed and directional control first may be the difference between success and a fatal crash.

(In practicing single engine flying always allow for a substantial loss of altitude in order to maintain airspeed in restarting a dead engine and for unfeathering. The safe altitude for acrobatic flying should be considered the minimum altitude for single engine practice flying.)

Disregard of these principles may result in the airplane being thrown over on its back, with a resultant spin. It is then difficult to get the stick all the way forward and cut both engines. If these things are not done the spin may easily continue. With the modern airplane, high wing loading and high horse power result in a great deal of torque and heavy weight; and as these factors all add up to high kinetic energy in a spin or spiral, many thousands of feet may be required for a complete recovery.

WINGS of WEST POINT

By Capt. Charles D. Frazer

Cadets take to the air as the Military Academy inaugurates flight training program at Stewart Field.

STEWART FIELD has no stately trees, no ivy-covered buildings, and very little tradition.

There's no time for tradition. Not now. West Point is "souped-up" for the duration. And, though only a few months old, Stewart Field, the Air Forces Basic-Advanced Flying School at the U. S. Military Academy, is as much a part of West Point as the East and West Buildings, the assault course, and the mule mascot of the football team.

The first group of cadets to be trained at Stewart began work on August 25 of this year. Wheeling BT-13A's out onto the runway, they took off from a field which was then, and still is, an air field in the raw.

Stewart Field was once the city airport of peaceful, historic Newburgh, New York.

Today, like many other Air Force fields, it is a boom town—a scene of cement and gravel, planks and blueprints, and the litter of fresh construction.

Bulldozers are everywhere — uprooting tree stumps, jogging out rocks and boulders, leveling great hunks of ground. Laborers in overalls and enlisted men in fatigues bustle in all directions. Army trucks swarm over neighboring roads.

On the south side of the field, half a hill has been cut away. There are scores of new red-brick buildings and the wooden frameworks of more to come. Flanking this colony is a 700-acre plateau, a broad L-shaped table-top, which soon will hold 6,000-foot runways. There is much to be done at Stewart. Construction will not be complete until September, 1943.

But already, from the welter of dust and dirt, there has taken form in the granite-filled mountains above the Hudson River a school which may well play a starring role in the future of the Army Air Forces.

The origin of the school dates back really to 1927, when an Air Corps Detachment at the Academy was first authorized. The detachment consisted of a few officers and enlisted men, a few amphibian planes, and a couple of hangars along the river bank.

But this was not enough for those Army fliers. "Ducks" were all right, but they wanted land planes, too. Unluckily, the country around West Point was too hilly for a suitable field.

They began to talk about Newburgh 12 miles to the north. In 1930, Samuel Stewart had deeded some land to the city and a cocktail napkin of an airport had been built. It was small but it would do.

For several years the Air Corps Detachment used Stewart Field as a base, and eventually, in 1937, plans for its expansion were developed.

Last fall, General George C. Marshall and Lieut. General Henry H. Arnold decided to introduce flight training as an elective in West Point's course of instruction. Flight training thus became the only major elective at the Point.

Obviously, Stewart had to become a field second to none in equipment and facilities. No one can foretell the number of cadets who may have to be schooled there during the war. In peacetime it should be able to provide full aerial training, primary, basic and advanced pilot work, plus both single and multiple engine experience.

The directors at West Point took a good hard look at their old blueprints, threw them away, and ordered new ones. They decided to move the hill. Instead of two hangars, they planned 10. They visualized mile-long runways that would accommodate any type of plane, up to the heaviest bomber. They projected all the manifold housing and recreational needs of the officers, instructors and enlisted men stationed there.

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AIR RESCUE in Jungle Country

By Captain Oscar Schneller
Senior Flight Surgeon

A PATROL BOMBER was down — somewhere in the Dutch Guiana jungles. The plane, with eight officers and men, had taken off at midnight from its base in Guiana, on a secret patrol mission along the coast. Nearly two hours had passed. No word had come in. Trouble was certain.

To the flight surgeon at an outlying Air Forces base, the phrase "plane missing" is an ominous challenge. It is like hearing "wanted in emergency" over a hospital loudspeaker. If there has been a crash, men's lives will depend on swift, decisive action.

Fears for the crew of the bomber were confirmed when the plane which should have been relieved of patrol duty returned to the base. No relief had appeared, no message had been received. Through the night, our field made ready for a search.

At dawn several search ships took off from the base. Less than an hour later, the missing plane was sighted about 28 miles to the east, apparently badly cracked-up. We did not know whether anyone survived the accident.

Captain Ernest Ljunggren, operations officer, and I left immediately in a C-61 to survey more closely the scene of the crash and to determine, if possible, the best way of getting help through to the crew members, should they be alive. Meanwhile, Captain Richard Gunckle, commanding officer, had organized a rescue squad which was sent out on foot with native guides.

Flying at tree-top level, we soon located the patrol plane. It had cut a jagged gash in the jungle and bits of wreckage were scattered all about. Two of the crew were alive, at least—for we could see them sitting on what was left of the tail.

We cruised low over the surrounding country. The nearest clearing of any size was six miles away. But this was too small.

Finally, about 10 miles from the crashed plane, we came upon a savannah that was spacious enough to offer some hope. By a pre-arranged signal, Captain Ljunggren notified the other planes that we were going to attempt a landing.

Then, gently and skillfully, Captain Ljunggren set the plane down into the clearing and brought it to a stop after a short, hard-bumping run. We rolled our ship to the edge of the savannah and prepared to enter the jungle, following a compass reading we had taken in the plane indicating the direction of the crash from the savannah.

Captain Ljunggren took with him a .45-calibre pistol, 50 rounds of ammunition, a compass, a head net, and two cans of rations.

I carried 50 rounds of ammunition, two tins of rations, and a first aid kit. We both had machetes, and ration cans to be used for water.

Starting into the jungle at 7:30 in the morning, we encountered heavy going. The trees and undergrowth were almost impenetrable, much of the ground underfoot was swampy; here and there were little streams we had to ford. Most of the streams were infested with alligators and man-eating fish. It was ticklish business.

Literally hacking our way along, we kept going, slowly, mile after mile, until dark. We then made a bed of palm fronds and slept, alternating two-hour watches.

At dawn we started off again and began firing shots at intervals. Around nine o'clock we heard answering shots from a machine gun and, cutting in toward the sound, discovered we had nearly passed the scene of the crash while a few hundred yards away.

Frankly, we did not expect to find many of the crew alive. But we were due for a surprise.

Captain Charles H. Ross, pilot and Lieutenant Roy A. Webb, co-pilot, were the only members of the crew able to walk, and all the others were lying by the side of the fuselage in a tiny clearing, several of them badly hurt. But all, fortunately, were alive. The group included Lieutenant Charles L. Jones, observer; Technical Sergeant Louis Castro, bombardier; Sergeant Gerald Forman, crew chief; Sergeant Herman Goldstein, radio operator; and Privates Albert K. Will and Andrew W. Budinsky, gunners.

Examination of the injured men disclosed several serious fractures of jaws and ribs, brain concussions, lacerations, contusions, and bruises. I gave the whole crew first aid and treatment for shock, then chlorinated some water from a nearby stream so our supply would be ample.

Captain Ross told us what had happened. The plane, apparently in good shape, had taken off on a direct course to the point of patrol and risen to 1,500 feet. About 15 minutes later both motors had failed without warning.

After trying vainly to discover the trouble, Captain Ross told the crew to prepare for a crash landing and maneuvered his plane into a shallow glide, giving Sergeant Castro a chance to get out of the nose.

Suddenly, the big plane knifed into the jungle with a terrific impact. All the men were knocked out. That they were not all killed outright was due only to the skill of Captain Ross in bringing the plane through that welter of trees, vines and underbrush.

Lieutenant Webb was the first to recover consciousness. Sergeant Castro's feet were in his face. They both had been thrown clear of the ship, into the jungle, a short distance from the fuselage.

Inspection of the plane revealed complete wreckage. The entire nose had been ripped away, both wings had been shorn off, and the two motors had been hurled into the undergrowth. Part of the fuselage was intact, although badly bent at the tail. Gasoline drenched the ground. The plane had been carrying a sizable load of bombs but none had exploded.

Captain Ross recovered consciousness a few minutes after Lieutenant Webb. Although injured themselves, they carried the other men to a place that had been cleared away by the crashing bomber, where Captain Ross gave them what first aid treatment he could with the plane's kit. Some of the crew were only semi-conscious when Captain Ljunggren and I reached the scene, a day and a half later.

Clearly, there was no time to be lost in evacuating these men. Captain Ljunggren said he thought he could take off from the savannah in which he had landed the C-61 and would take along Lieutenant Webb, who was in the best condition of the injured crew. I gave them a list of the medical supplies and the food and litters I would need.

Even though the trail had been cut through, it took Captain Ljunggren and Lieutenant Webb several hours to retrace

A flight surgeon gets a look at the rough side of Dutch Guiana and helps bring a bomber crew back alive.

the 10 miles to the plane. But, just before dark we heard the drone of motors and saw them circling overhead, the signal that all was well and they were en route to the base.

Meanwhile, I was busy doing what I could for the men. I gave them stimulants from a special kit and stopped the severe bleeding from which many suffered, cleansed and bandaged the deeper wounds, avoiding suturing as much as possible because of septic conditions.

Despite this treatment, however, it was clear that our plight was serious. All the men were suffering badly from shock. Quick hospitalization was imperative.

At dawn the following day another plane flew over, signaling that it would drop supplies. Soon a huge bundle of litters, blankets, food and the like floated down to us by parachute, making a perfect bull's-eye through the hole in the trees.

Not long after the rescue party from the base arrived. There were 20 infantrymen under Lieutenants Arthur, Lemon and Calhoun and 15 native guides. It had taken them two days to cut their way through 28 miles of dense jungle and they had been able to do it only because planes had flown over them from time to time, indicating the direction to follow. So heavy was the foliage that they had been unable to see the planes much of the time but took bearings from the sound of the motors.

It was quickly decided that evacuation by foot through the jungle would be too arduous and take too much time. Our best bet was evacuation by air from the savannah in which Captain Ljunggren and I had landed.

After the rescue group had rested, we bundled the injured men onto litters and began our trek, with some of the infantrymen and guides leading the way, cutting the trail wider for passage of the main party.

It was late afternoon when we reached the clearing. I set up a first aid station and made the men comfortable. More planes appeared to drop food to us. We spent a miserable night, for the place was infested with sand flies against which even head nets were no protection. Nobody slept.

Next morning Captain Ljunggren flew over in a medium bomber and dropped a note requesting that the clearing be surveyed to determine if he could land. Captain Ross examined and measured the ground. He decided, that with some more clearance work, the plane could safely come in.

This job of slashing down underbrush and vines and laying out and marking a runway with stakes took about three hours.

Then, as Captain Ljunggren flew over once more, the men waved a signal that the field was ready. The plane swept low toward the clearing but couldn't make it. Captain Ljunggren circled, tried again. But again he changed his mind and pulled up. At last, on the third try, he brought the ship in for a perfect landing and came to a stop just short of the danger area.

The bomber would hold three men at a time in addition to Captain Ljunggren, Lieutenant Wilhite, and Technical Sergeant Holmes. So a fast ferry service was begun, with the plane taking off and landing in an incredibly small space on each trip. After the injured men had been transported, the infantrymen and I returned in the same manner. The native guides came back over the jungle trail.

At the field hospital the men's wounds were dressed and sterilized, and shock treatment was administered. The patients rested for 24 hours and were transferred by plane to the Trinidad Base Hospital.

There was nothing spectacular about the medical side of this evacuation. The work was commonplace, everyday flight surgeon's work. But the evacuation itself was a significant example of the kind of rescue being duplicated again and again by the Army Air Forces, on a wide variety of fronts.

Because Captain Ljunggren and I were able to fly into jungle never before visited by white men, a severely injured air crew received first aid that was urgently needed. Because planes could fly out quickly from the base, we had a constant supply of food, medicines, blankets, litters, and other necessaries. Because planes served as guides, a rescue squad reached the accident on foot in much less time than it would ordinarily have taken. And, finally, because a bomber transported the men to a hospital in a matter of hours rather than days or possibly weeks, many valuable lives were saved and the total illness time substantially reduced.

Yes, every man recovered and is back at his flying duties. That to a Flight Surgeon means a battle won.

OLD BAG OF BOLTS

(Continued from Page 7)

arrival. Pilot Funk decided to go to a satellite field in Burma to escape a possible followup attack. Luck was with Bolts. That night the Japs raided Rangoon three times. The return to Java with General Wavell was easy.

Singapore fell and the Japs began their first raids on Java. The raids kept Bolts on the alert staying away from her field while the Japs strafed it. When the air raid alarms came, Bolts would lumber out to the runway, take off and fly south over the water and wait for the all clear to be given.

Then Bolts was ordered back to Darwin, departing February 19, the day of the big Jap raid. About two hours out of Darwin, she got radio information warning her not to come in, so she landed a few hundred miles to the south, waited, and then came into Darwin shortly after the attack.

When the Japs went to work in earnest on the invasion of Java, Bolts was called upon for evacuation work. Twice she went back into Java from Darwin, bringing out 20 evacuees each time. Luck continued to ride with Bolts. The day after she left Broome, Australia, with the last lot of passengers she had taken out of Java, Broome suffered a heavy raid. After it was over, she went back to Broome under cover of night to bring out personnel.

Bolts made a second trip to the Philippines. This time she took in sorely needed supplies for the wounded who had escaped fallen Battan and Corrigedor. In addition to her crew of seven, she brought out 30 officers and men from that secret airfield on Mindanao, including Lieutenant John Bulkeley of Navy PT boat fame.

That was her last trip for the Ferrying Command. Within a few days her crew was called back to the States and Bolts was turned over to the Commander of the Southwest Pacific. When Lieutenant Funk and Bolts parted company they had been together nearly 400 hours.

Bolts made one more daring trip after that, back to the Philippines in another rescue attempt. It was her last.

The gas load gave Bolts only a few minutes to locate the Mindanao airfield. She circled overhead, trying to get a signal through. The Japs were everywhere; perhaps they had taken the field. Bolts didn't make contact in the darkness. She headed back toward Australia.

But Bolts couldn't make it back with the remaining fuel. She headed toward an island for an emergency landing. Her position was radioed to aid in the rescue of her crew.

Then Bolts gave out of gas. She sat down in the water a few hundred feet off shore. After more than 600 hours her motors sputtered for the first—and last—time. And then only because she lacked fuel.

Members of her crew swam to safety and later were rescued by a submarine. Beyond saving was A. C. Serial Number 40-2376.

They don't hand out awards for airplanes, and we don't mean to get sloppy sentimental over a big hulk of steel, but in our books Old Bag of Bolts went down with a Congressional Medal of Honor pinned to her fat chest.

The ranks of the officers and the grades of the enlisted men mentioned in this story were those held at the time the action took place.

THE AMERICAN CONTINGENTS

A Briton's Message to British Airmen

by Fletcher Allen

AIR MINISTRY publications have dealt at some length with conditions to be expected by personnel going to the United States. Now the flow is in reverse. American forces are coming to this country. We are the hosts, not the guests.

The arrival of large contingents of American forces, and their impact on us, will make adjustment of attitude and outlook necessary.

There will be occasions of irritation on both sides, not because one is British and the other American; but because they are people.

There is as much likelihood of such friction between two Englishmen, or two Americans, as there is between an Englishman and an American. We are not yet, thank the stars, regimented out of our personalities.

When we are, the Nazis will have won a major victory for their philosophy.

At the same time, looking at the broad issue, we may be required to discipline our personalities because fifth columnists, spies, Nazi propagandists and all subversive groups will fasten with delight on any indication of impaired collaboration.

In this country, the British have the larger share of responsibility. There will naturally be an element of personal selection in our likes and dislikes, just as there is between Briton and Briton. There will be different stresses and a different outlook. Some are personal, some are economic. Americans will not be Anglicised overnight. For one thing they don't want to be; for another, there would be no gain if they were.

Americans have a different vocabulary, a different tradition, a different accent. There is as much difference, however, in these matters between Yorkshire and Sussex or California and Maine. Notwithstanding such differences, the United States builds up into a unity, as Britain builds up into a unity, and local variations are accepted as being in the family. Nations are much more than the sum total of acreage and population.

Quarrels still occur between individuals; there is a fair amount of scrapping in York, and in New York. Some of us go on a "binge," so do some of them. Neither has a monopoly of bad language, nor of good manners. We're just human, showing to better advantage, possibly, individually, than in bulk. Whether individually or in bulk, the point of departure is the realization that we are two strong peoples, with the virtues and faults of our strength, pulling together, anyway because we must, and learning to pull together because we like to.

There are some other points of potential misunderstanding. One is—cash. American rates of pay are higher than ours. That should certainly not be a personal grievance between individuals. It may be the American's good fortune and allow a greater latitude than we can always rise to. The Americans are, incidentally, usually good spenders and do not like to be thought "fumblers." Mostly, when they are lavish it is without any desire to flaunt their higher pay. More often than not it is a liking to share out.

Another human interest enters. There is an understandable tendency among some of our young women to find a stranger who speaks our language entertaining. The girls in the United States and Canada are showing a similar interest in our lads. That is an individual matter, and not one on which generalization can be made. Some of our American visitors will certainly make friends among the girls. We cannot reasonably expect them to become recluses, or be unresponsive.

We tend rather to understatement. The Americans like emphasis that not infrequently sounds like exaggeration. Emphasis is not always line-shooting, any more than understatement is always efficiency gone modest. They may be equally powerful expressions, according to temperament and custom, of the same pride and purpose; but each form takes an understanding by the other fellow.

As individuals, we are concerned with the details of collaboration. It is for the Governments to deal with the broader issues, but if individuals fail in their job the Governments cannot succeed.—*Condensed from the Royal Air Force Journal.*

Wright Field

THE words "Wright Field, Ohio" are renowned among airplane designers, builders and fliers the world over.

They are all but magic words because they stand for 15 years of successful pioneering on the technical frontier of aviation, because they mean high quality design and performance, and because they stand for airplanes like the Flying Fortress that executed a successful mission and still flew home with 1500 bullet holes in its wings and fuselage.

If you're going to deal with Air Force materiel—and that's everything from bombers to bolts—you're going to have to deal with Wright Field. There all the equipment the Air Forces use was either conceived, developed or tested—tested and retested—at the Materiel Center near Dayton.

In many ways Wright Field is the spawning ground of American air power. On its designing boards and in its fluorescent-lighted labs are spun the cocoons that hatch weapons for aerial warfare on all the fronts.

The tail of the B-19 dominates this view of a flight line at Wright Field. In the background are laboratory buildings and planes of many types and sizes.

Wright is a Battlefront

Meet "Horatio"—the mechanical man who works 24 hours a day testing flying suits.

Made-to-order rain is used to test this prop's ability to hold up in rough weather.

AT FIRST GLANCE Wright Field looks more like a Hollywood movie lot than an air base. Great cranes swing engines, parts and whole planes overhead; big bombers waddle behind small motor tugs up the paved, city-like streets that run between the lab buildings; grotesque shapes of testing devices cast futuristic shadows over the landscape.

Out on the flight line Messerschmitts and Spitfires are lined up beside the P-40s and B-26s. Labs contain the latest German and Jap equipment taken from planes shot down over Allied territory. At Wright they've taken everybody's plane apart to see what makes it tick.

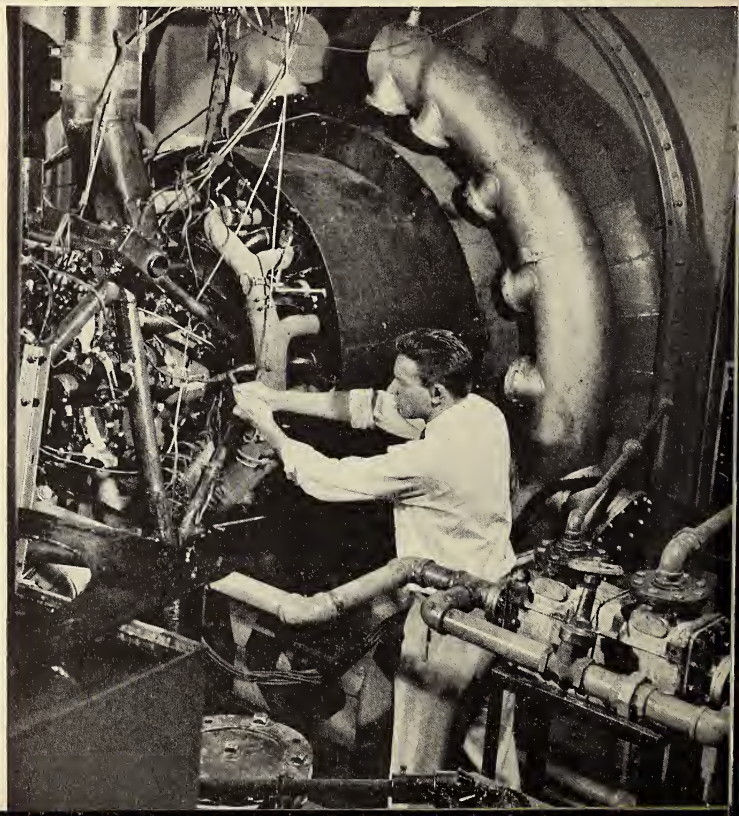
In the great labs of Wright Field there is a battle going on—just as much a battle as those fought over Kiska and Cologne. Here military and civilian technicians match their wits and energy in a deadly contest with the aero-engineers of the Axis. Upon their success or failure may hinge the outcome of this war.

You can tell how hard they are trying to win from the lights that gleam from lab windows all night long, and from the roar of prop and engine testing that fills the air around Wright 24 hours a day.

Boss of Wright Field is Brigadier General A. W. Vanaman, who works directly under Major General O. P. Echols, Commanding General of the Materiel Command. Helping General Vanaman with the engineering phase of his job are Brigadier General K. B. Wolfe, Chief of the Production Division, who supervises the mass production of all Army warplanes, and Colonel F. O. Carroll, Chief of the Experimental Division, who runs the research and development program of the Materiel Command.

To aid General Wolfe and his Wright Field staff control the manufacture of Army planes, the Materiel Command has divided the U. S. into four Procurement Districts (Eastern, Central, Midwestern and Western) each with a District Supervisor and a staff of factory representatives that handle Air Force interests on the spot. These districts, together with Wright Field headquarters, are responsible for meeting production schedules, supplying parts and tools in sufficient quantities, and issuing change orders on contracts to keep factories abreast of latest aeronautical developments.

The radial engine below is being placed on a test stand for a trial run to determine its operating characteristics. In this test, the engine pulls, not against a propeller, but against a specially-constructed dynamometer equipped with water brakes.



The 10-pound bags on this C-47's wing show how many "Gs" it will take before cracking.

ENGINEERING isn't the whole story. In addition to the laboratory and production work, all Army Air Forces materiel contracts are written and awarded at Wright Field. This is a big job, and it involves a lot of money.

The man who handles it is Colonel A. E. Jones, Materiel Command Contracting Officer, shown at left affixing his signature to a typical Air Force contract. As one of the country's two or three top spenders, Colonel Jones has signed or supervised the signing of all AAF materiel contracts since 1939. During this period of time he has controlled the expenditure of many billions of dollars.

Colonel Jones, who has contracted for as much as 400 million dollars worth of aviation equipment with but one swish of his pen, once signed all Air Force contracts himself—now he needs 51 assistants.

In his efforts to buy exactly what the Air Forces want, Colonel Jones works in close cooperation with the engineers of Wright Field, who draw up detailed specifications of all proposed purchases. These "specs" are part of the contract, and no variations are permitted unless a change order is issued by the Contracting Officer.

This shelter hood keeps the weather and prying eyes away from a secret project.

WINGS OF WEST POINT

(Continued from Page 15)

Then the dirt began to fly. Ten months later, on August 25, Stewart Field, "Wings of West Point," was dedicated.

The field was rough and full of debris, but it was ready. When Major General Francis B. Wilby, superintendent of West Point, summed up the significance of the occasion, he called the decision of Generals Marshall and Arnold "one of the most momentous in the history of the Military Academy, if not in the life of the nation."

Since that hot August afternoon, day after day a steady stream of BT-13A's has kept the air about West Point churning with activity.

There are 245 cadets in this first group of students. They are in the class of 1944. Ordinarily, they would have two years of training ahead of them.

But West Point's course has been shortened from four years to three, so these men will graduate next June, a year ahead of time. Somehow, they must get in their flying time, must absorb the rudiments of aerial navigation, bombardment, and kindred subjects, and at the same time must keep up with all the other studies at West Point.

These courses include chemistry, modern languages, mathematics, physics, history, military art, military engineering, military history, mechanics (including thermodynamics and fluid-dynamics), ordnance, economics, government, military topography and graphics, military law, military hygiene, military administration, theory of flight, weather, and the tactical employment of Air Forces. That, understand, is in addition to the instruction they receive for flight training which takes in navigation, meteorology, aerial mapping and photography, code and communications and, of course, actual flying.

Each cadet in this first class at Stewart took primary flight training at a civilian school. Chances are, he gave up his summer furlough to get it. No primary instruction will be scheduled at Stewart for awhile.

TODAY, the flying cadet lives at the Point and pursues the routine of his class. First call is at 5:50 a.m. At that time, the cadet arises, gets dressed, polices his room, and stands reveille at 6 o'clock. Breakfast is at 6:30 and by 7 o'clock he's on his way to Stewart Field for flight instruction. He leaves the field in time to stand noon formation at the Point, eats lunch, and gets to class at one o'clock. After three hours of class, he may either get practical field exercise or continue an additional two hours of directed study. At five, he leaves the classroom, dresses, stands afternoon formation, and eats the evening meal. Then comes a precious 25 minutes that are unscheduled —the cadet's own. At 7:30, call to quarters, and two inspections before 10 o'clock taps.

The second class men, who are doing their basic flight training at Stewart Field, must also recite each day in mechanics, three mornings a week in chemistry, and two or three afternoons a week in languages. If it rains, the cadet gets an additional two hours in military topography and graphics—one hour to study and one hour to recite, for the West Point system is based on a recitation and grade for every man every day, not a quiz now and then.

The average day, outlined above, is Monday through Friday. Saturday is usually half-day, but in many cases the flying cadet uses the week-ends—including both Saturday afternoon and Sunday—to make up some of the flying hours he might have missed because of bad weather. The command at Stewart Field is exceptionally careful never to send cadets into the air when the weather is threatening.

An advanced flight training course will be activated at Stewart Field in December.

The cadet now taking his basic will begin advanced training on New Year's Day, 1943. He will continue his ground school work, taking such subjects as photo interpretation, identification, armament, gunnery and bombardment.

Next June 1, he will get his wings as a pilot and, at the same time, graduate from the Military Academy with a complete background of military education.

By then, younger classmen of the Point will be coming along and Stewart Field will be in full swing.

This speed-up of instruction at the Academy has been accomplished by close scheduling of study periods and by wartime elimination of certain activities, such as the famous and impressive dress parades.

Today, Colonel John M. Weikert, commandant of the flight school, is worried about one thing—weather.

"Winter is hurrying us," he explains. "After a certain time up in this country, you simply can't pour concrete. But if we can't pour concrete for the new apron, let us say, we'll just finish up with gravel and keep going." That seems to be the whole spirit at Stewart Field—keep going. Nothing else could have brought about the results already visible.

More than a hundred buildings have been erected. This fall has been one "Grand Opening" after another. One day it would be the opening of the PX. Another, the first service chapel on the hill. Another, the first night of the camp movie theatre.

ENLISTED men, assigned to Stewart for duty in school and service squadrons, had to be housed for months in a "tent city" in woods bordering the field. But just before cold weather set in, the camp was struck and the men all moved happily into brick barracks. Bachelor quarters and a club for officers have since been completed.

The principal concern of the officers directing Stewart Field, of course, has been the actual airplane and training facilities. Almost all these are completed or nearing completion—runways, hangars, operations headquarters, storage rooms, a control tower, Link Trainer buildings, ground school classrooms, libraries, and the rest. Three auxiliary fields are in the making.

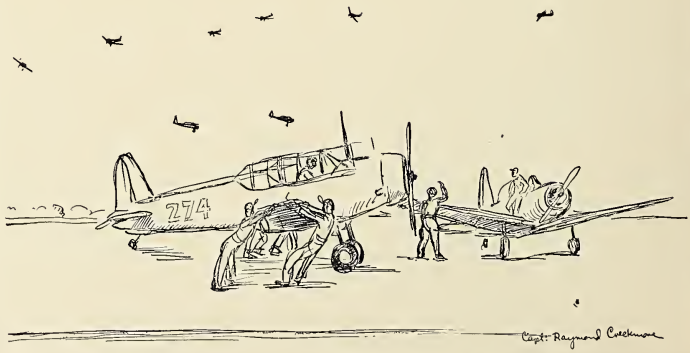
When construction of Stewart Field is finished next September, 200 officers and 1,800 or more enlisted men are expected to be on duty there. From 250 to 300 cadets should be in training by that time.

Right now, Stewart is strictly on a wartime basis. Every man on the field, civilian or officer, "G.I." or cadet, is in a big hurry. A sign at the road entrance reminds them that "Hitler Won't Wait."

The men training in this first class are in a special hurry. They are going places, preferably to the points marked by arrows on the front of a hangar, where signs read "To Berlin—3,121 Mi." and "To Tokyo—8,117 Mi."

This atmosphere, come to think of it, is a tradition in itself—a logical heritage for the new, raw "Wings of West Point." As one officer at the field puts it:

"Some day Stewart will have some ivy, too."



Attack bombers strafing an armored column on desert maneuvers.

PRELUDE TO DESERT COMBAT

By Major John McL. Redding

America's air and ground forces are learning to adapt the fickle ways of the sand country to the requirements of modern warfare.

THE desert floor is sparsely clothed with stunted growth: cactus, mesquite, Joshua trees, sage brush and Palo Verde. The soil consists of sand and rubble from the mountains. Like an abandoned brickyard, the loose rock and shale make traveling by foot virtually impossible.

Tanks and half-tracks have supplanted the Gila Monsters and jack rabbits as denizens of the desert. When these armored monsters move they mark their progress by towering walls of dust. But when they remain still the tanks and half tracks blend into the desert floor. With rudimentary camouflage, tanks melt from sight in an unbelievably short distance.

From the air, at 3,000 feet, it is impossible to pick out a stationary tank. An entire armored regiment, if properly dispersed, cannot be spotted. From the air the desert floor seems bare.

"The explanation," explained Colonel R. H. Lee, who led the Second Air Support Sub-command in recent desert maneuvers with the Armored Force, "lies in the distortion caused by the heat."

"When I first flew over this area last May I couldn't see a hiding place anywhere. But the truth is that the whole desert is one huge hiding place for vehicles that remain stationary. Ground commanders should always remember that. If they let the dust settle and remain stationary the planes above cannot pick up their dispositions."

This is one of the lessons learned in the desert by the Air Forces Air Support units. They have learned too that it is impossible to tell the difference between tanks and trucks from normal heights when the vehicles are in motion. The heat waves emanating from the superheated sand destroy all form for the eye.

"But," Colonel Lee pointed out, "There's one thing to remember. When you see a dust cloud, and you can't safely come down to look the column over, there is much to be learned by just watching the dust.

"If it billows along in a solid wall, that's a truck column. If the dust wall is marked by curling spires of dust, it indicates track-laying vehicles—tanks or half-tracks. But you can't always be sure. There's a little trick they pull out here. They have the peeps dressed up with paper maché coverings that make them look like light tanks. They drag empty gas cans and logs behind them to help stir up dust. When you run into anything like that from the air you must be very careful. Otherwise you'll have your people out chasing the paper tanks while the real ones smack you somewhere else."

Air support is the big problem of the desert maneuvers. The United States Army in the western desert of California is trying to develop a combination ground-air striking force that can move with speed and power. The highly mobile tank units can strike and be gone within a margin of minutes. To be effective, combined tank and air operations must be co-ordinated to the split second.

The low-flying elements of the air support unit must strike immediately in front of the advancing tanks. They must be devastatingly swift. The attack lasts only a few seconds; then the tanks and the armored infantry take over. From there on in, with

(Continued on page 34)

Technique

A Monthly Review of Technical Developments in the Air Forces

SUBSTITUTES

A Short-Cut to Victory

CRITICAL shortages of raw materials are more of a challenge than an obstacle to engineers of the Army Air Forces and the aviation industry.

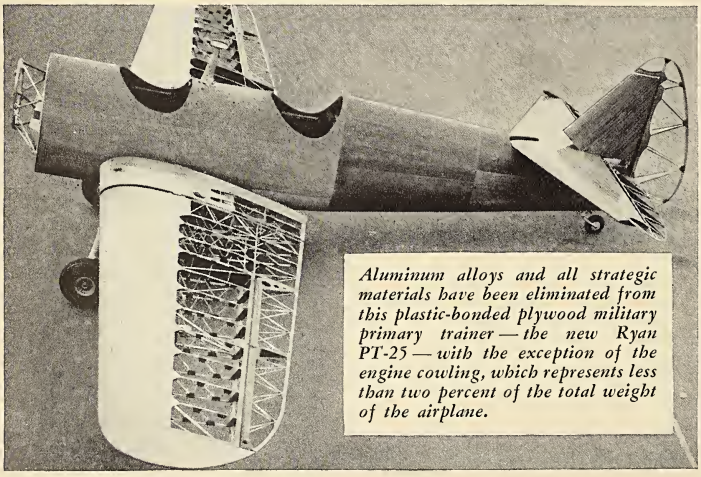
The biggest challenge so far—the aluminum shortage—is being conquered by the successful introduction in large quantities of plastics, plywood, fiber, steel and wood into airplane manufacture. The use of these materials saved over 30,000 tons of aluminum up to September 1, 1942. The substitution of wood for aluminum in training plane propellers alone has saved over 250 tons of this vital aviation material.

The next biggest challenge—rubber—is being taken care of just as successfully. The discovery and utilization of non-critical materials have so far reduced crude rubber consumption on over 600 different items of equipment, and completely eliminated its use from over 250 more. The largest single saving of rubber—10,000 tons—was accomplished through the development of a new self-sealant for fuel tanks that requires 25 percent less crude rubber than formerly.

This big saving has been augmented by such other "tricks" as substituting plastics and leather for rubber-coated fabrics in cushions and linings, by using felt on seat pads, by eliminating rubber grips from control sticks on certain airplane models, and by utilizing linoleum in the manufacture of bombardier's window mats.

Such discoveries do not come accidentally. Thousands of tests are involved: flight tests, wind tunnel tests and laboratory tests. In the battle to save aluminum, AAF technicians went over every airplane in the Air Forces with a fine tooth comb and microscope. They changed name plates to plastic, compass parts to bakelite, conduit clips to hard fiber, trim tabs and cockpit flooring to fabric-based plastics, and camera parts, instrument cases and hose connections of oxygen masks to steel and plastic.

But aluminum and rubber are not the only materials for which substitutes have been adopted. In two plane types, 33,700 pounds of copper have been eliminated through substitution. Over 420,000 pounds of nickel was saved when the exhaust system of the B-17 was changed to stainless steel.

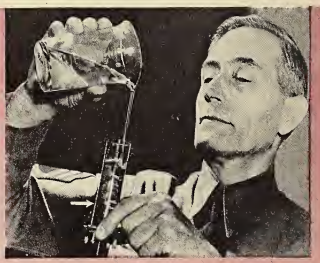


Aluminum alloys and all strategic materials have been eliminated from this plastic-bonded plywood military primary trainer — the new Ryan PT-25 — with the exception of the engine cowling, which represents less than two percent of the total weight of the airplane.

High-grade chrome and nickel is being conserved through the use of lower grade steels that need little or none of the critical materials normally required in ferro-alloys. Bolts, for instance, have been changed from a nickel alloy steel to a less critical molybdenum steel without interfering with the performance characteristics of the airplane.

Other materials, critical because of supply, processing or shipping reasons, are being conserved on an ever-increasing scale. In July the Air Forces cut down its requirements for high octane gasoline by 5,175,000 gallons, its mica requirements by 565,000 pounds, and its silk needs by 98,208,000 square yards.

Throughout the search for substitutes, engineers have conducted hundreds of tests to assure the maintenance of adequate safety margins. Some substitute materials have resulted in increased weight, some even in greater strengths than the materials they replaced. Generally, engineers of the AAF Materiel Center at Wright Field believe that all substitute materials now being used on production lines are at least as good as the materials they replaced.

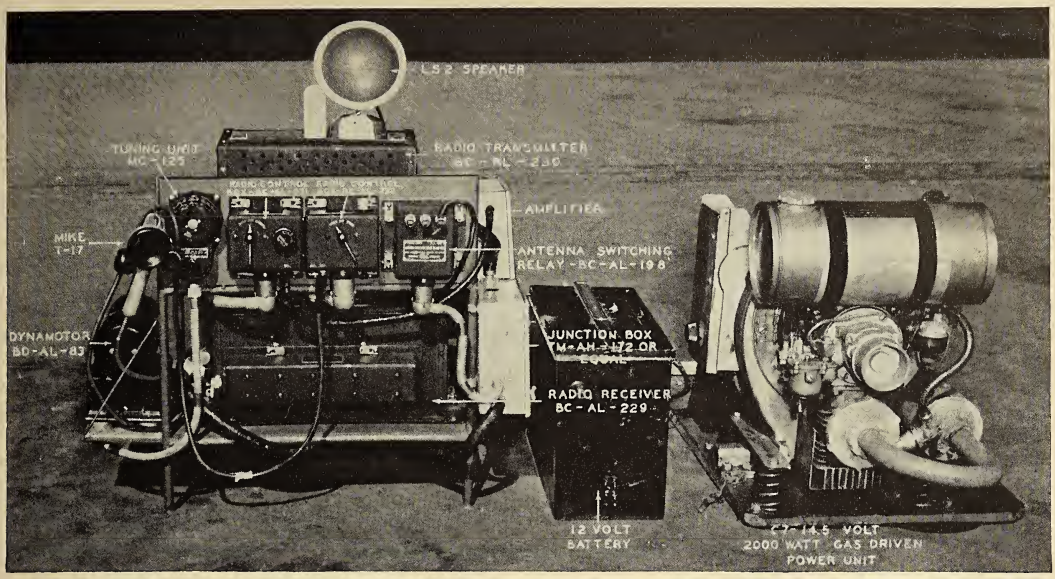


One-Man Laboratory

MASTER SERGEANT DAVID SAMIRAN (above) of Wright Field is a one-man research and invention laboratory. Since coming to the Field in 1928 he has taken out patents on 14 inventions which are in standard use by the Air Forces, and has 21 more applications now on file.

One of Sergeant Samiran's most important inventions is the segregator device used to separate water from the gasoline used in Air Forces planes. He began work on this system as far back as 1921, and has gradually developed it until today his segregator pumps (carried in gas trucks) can deliver 210 gallons of gasoline per minute into airplane fuel tanks. Standard Air Forces gas trucks now have two segregator pumps, permitting one truck to fill planes at the rate of 420 gallons a minute.

Sergeant Samiran's segregator is based on the principle that water is heavier than gasoline. Each segregating unit has a separator which floats on water but sinks in gasoline. The water, therefore, sinks through this separator and drains out the bottom of the container while the gasoline remains above on the inside.



Gunter Field's new radio communications unit.

Flexible Radio Unit

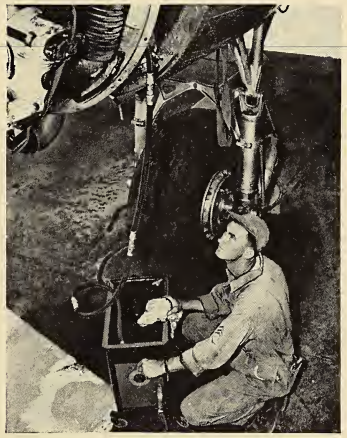
COMMUNICATIONS flexibility has been achieved at Gunter Field, Alabama, through a transmitter-receiver radio unit designed by the staff of the Post Communications Department.

Originally designed as an emergency control tower unit, the transmitter-receiver, with its compactness, light-weight and mobile features, has proved invaluable in many other phases of operations in and around air fields. Its simple design permits inexperienced personnel to set up the outfit and quickly put it into operation.

At Gunter Field the device has proved very efficient in locating the scenes of airplane crashes. This is especially true in mountainous or forest-covered terrain where the spotting plane, after locating the wreckage, conducts a radio-equipped command car to the crash via the shortest route.

The unit has also proved extremely successful in controlling air traffic for night flying. When auxiliary fields are used, a reconnaissance car equipped with the unit may be dispatched to the field and used as a base for ground-to-air communications from radio set SCR-AL-183. Another use has been discovered by the Gunter Field Provost Marshal, who utilizes it on his military police cruising cars. These cars, making their patrols on the post and in nearby Montgomery, keep in constant touch with the city police radio, the post military police headquarters and the control tower.

The original device was built under the direction of Lieutenant W. R. Sturges, and has since been improved by Lieutenant R. J. DiMartino, Post Communications Officer, and the personnel of his department.



Sergeant Wiplinger operates the new "mechanized" pre-oiler

No More "Burn-Outs"

ENGINE "burn-outs"—long a curse of aviation technicians—have been almost eliminated at the Albuquerque Air Base, New Mexico, by means of a mechanical "pre-oiler" developed by Captain William Hamrick, Chief of Albuquerque's Engineering Division, and Staff Sergeant Bernard Wiplinger.

Every time a burn-out occurs it means a new engine must be installed while the damaged one is removed, crated, and sent to an air depot for rebuilding, with a consequent wastage of valuable time, mechanical skills, and equipment. Often planes with burned-out engines are out of service for a week or more. This, to Captain Hamrick and Sergeant Wiplinger, was a situation that could stand correcting, and they set out to do something about it.

First they studied the cause of burn-outs and found that most were attributable to the haphazard and varied methods by which most AAF engines were oiled before flight. Since this was done manually, it was impossible to achieve any kind of uniformity and guesswork was often resorted to. Periodic burn-outs were the result, sometimes within 15 minutes after engines had been tuned up.

In his search for an answer to the problem Captain Hamrick went first to the commercial airlines. Although their system proved impractical for AAF adaptation, it did provide him with an idea.

After experimenting with the idea on an assortment of pumps, solenoids, power units and other miscellaneous equipment, he was finally ready to begin construction. This was Sergeant Wiplinger's job. From a selection of used airplane parts he made the first machine, consisting of a pump energized by a battery unit, an oil reservoir with a capacity of two and one-half gallons, a hose attachment and a set of regulating instruments, all controlled by a central switch.

After a number of preliminary tests and final adjustments the machine was given a final test in actual maintenance of "line" planes. It was a success. Over a period of two months 15 planes were pre-oiled with the machine and not a single burn-out resulted. In addition, the time required for pre-oiling was reduced from two hours to approximately 15 minutes.

Plans for the standardized use of Captain Hamrick's pre-oiler throughout the Air Forces are being formulated.

Park Trainer Aids Aerial Photography

ONE of the most valuable pieces of aerial photo equipment to come out of AAF laboratories is the Park Trainer — a photographic training device invented by Lieutenant Colonel W. Sidney Park, formerly of Lowry Field's photographic school.

The Park Trainer is to the aerial photographer what the Link Trainer is to the aviator. Simulating actual flying conditions, it

Colonel Park Inspects His "Trainer"

gives prospective aerial photographers a thorough realistic training on the ground before they take the air.

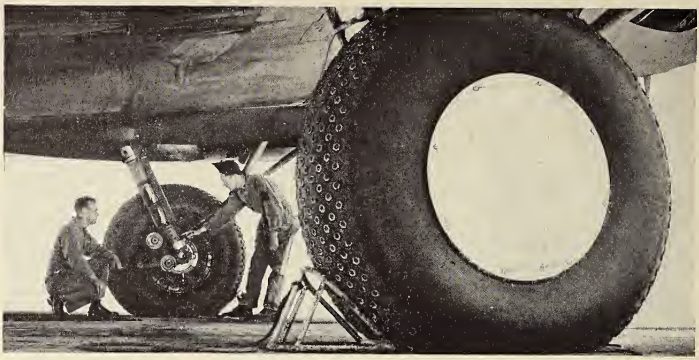
Operation of the trainer is intricately clever. A cabin is equipped with a standard camera and view finder. An image of mosaic, or aerial map, moves across the ground glass in the view finder in the same manner as the landscape moves across the view finder in a real airplane. The cabin can be tilted, and "crab" (turning of the plane into the wind to offset drift) can be introduced to require corrections by the photographer.

Pictures are not actually taken by the device, but it does record how accurate actual photos would have been. In these calculations it automatically records the crab and tilt the student had to overcome.

"An average student," says Colonel Park, "will have obtained sufficient practice after about 10 lessons of 15 minutes each to take vertical mapping pictures as well as the man who has a great many hours of actual experience in the air." This shortens considerably the long hours of flight training usually necessary for aerial photographers.

This is not the first venture into photo experimentation for Colonel Park. He has also built the Park aerial precision camera and is a veteran of over a quarter-million square miles of flying shutter work. He is now on duty at Bolling Field, Washington, D. C.

The colonel began work on his trainer before he came into the AIR FORCES two years ago.—*Sgt. Jack Angell, Lowry Field.*



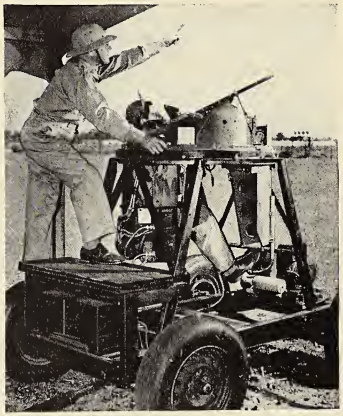
Because conventional airplane tires having all-rubber treads usually skid on slick ice and snow, a new type tire with sharp cylindrical inserts that look like beer-bottle caps are being manufactured for the AAF to guarantee safe winter landings on northern airfields. A pair of the new tires, with their "ice-grip tread" visible, are shown above.

New Photo Fluid

OUT of the dark room of the Photographic Section, Shaw Field, S. C., has come an improved photographic developing formula which not only removes defects in over-age film but increases sharpness of detail.

The formula was discovered after a month of patient experimenting by Corporal Steve Gouzeas and Pfc. Clarence Leino. It is a developer formula that provides for normal film speed, good tone range, normal contrast and fine grain. Even when photographs are enlarged up to a hundred times their original size, they still retain their detail and contain a minimum amount of grain.

In the new mixture, which is called "Lego," there is a preponderance of sodium sulfocyanate. According to its discoverers a new formula can be mixed at a cost of 75 cents a gallon and it has excellent keeping qualities.



Captain L. B. Whitfield, MacDill Field, shows a prospective gunner of the Third Bomber Command the finer points of aerial gunnery on his turret-mounted shotgun.

B-17s Get New Filter

A NEW air filter, developed by Colonel Leslie G. Mulzer, commanding officer of the MacDill Field Sub-Depot, Florida, has simplified maintenance of the Flying Fortress and increased engine efficiency by 300 to 400 percent.

The filter, perfected and first put into experimental use at MacDill Field, is now standard equipment on all B-17s.

By covering the air intake opening and preventing particles thrown up by the propellers from accumulating in the engine, the new device has kept sand and grit out of the carburetor induction system and greatly lengthened the operational period of Fortresses between overhauling.

Before adoption of the filter the average period of operation for B-17 engine was 40 hours. Colonel Mulzer's invention has boosted this time to as high as 700 hours, by minimizing the wear on the piston rings.

"Our chief trouble before," the colonel explains, "was feathering of piston rings, but the filter has counteracted this."

ALASKAN OFFENSIVE

(Continued from Page 5)

He'd have to be a weather-hardened poet, to be sure. The Aleutians are up where the weather begins. Strictly impartial, the weather protects friend and foe alike. But too often the unpredictable mists that sweep over Kiska Harbor provide the Hirohito clan with the afternoon, and sometimes the next day or two, to repair the damage that bombers and fighters have spent all morning inflicting.

Crewmen of the Air Force up there don't bother to pray for impartiality, or decent weather. All they ask is half-decent, even tenth-decent weather—any kind of weather that will give them two or three shots at Kiska the same day; if possible, for two or three days in a row.

But after a summer and fall of it, the Air Force has grown used to the weather and used to life in the Aleutians, despite the fact that life goes on pretty much the same day after day. After Dutch Harbor, headquarters became the advanced base from which land-based planes operated during the raid. On that gray, treeless island, home became a tent dug in against strafing, and friendly rivalry developed over whose tent would be best prepared for the hard winter. Revetments were dug around each tent; lumber was carefully "salvaged" to make doors and sketchy flooring. The grass that tried to grow during the summer turned out to be a pale green in color; a patch of radishes planted for a "victory garden" sent up sprouts only one inch high in three months.

Wells were dug almost anywhere to furnish cooking water. The water was close to the surface and digging was easy. The men even found a way to take a hot shower. They dug up a 55-gallon water tank, fitted it with intake and outlet spigots and attached it to a pipe of icy water. When the water reached the right level they poured fuel oil on top and tossed in a match. After a decent interval of pyrotechnics, they could risk a warm, if somewhat smoky, shower bath.

Life on the base has always been dominated by the constant raids on Jap installations. And the long list of decorations awarded since Dutch Harbor proves that the Air Force takes its chances on fog and ice and tricky crosswinds, on long hops over water cold enough to freeze a man in 20 minutes, and on all the Zeros and ack-ack the Japs can get into the air.

"For repeated day and night over-water instrument flights during icing conditions in the Aleutians to attack an armed enemy," is the phrase most often used in official citations. "Going the full range of the ship without regard to the safety margin of fuel," is another phrase that appears regularly. Citations describe "flights in bad weather under a ceiling of from 50 to 300 feet in an attack on an enemy naval concentration." Still others cite transport missions carrying personnel and vital supplies, flying unarmed and unescorted over hostile areas patrolled by enemy craft. The list of citations is long. Many of the awards have been posthumous.

Weather be damned, the battle is being won. The occupation of Attu, Agattu and Kiska islands has been hard to crack.

But Jap installations did not long remain a lengthy over-water jump from the Dutch Harbor area. Something new developed in the Aleutians.

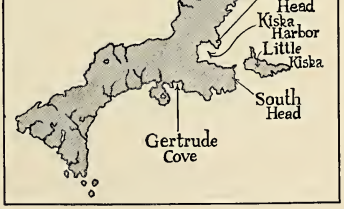
It started one morning as August drew to a close, when a strange collection of American surface craft was herded within the protecting area of its convoy. The collection ranged from huge transports to the little tug towing a four-masted schooner loaded to the gunwales with gasoline and a thousand and one miscellaneous items. Curtained by fog, the surface vessels headed westward.

Not a Jap plane marred the murky sky or a Jap warship the gently rolling sea as the convoy crept at a snail's pace past the rocky shores of the Andreanof Islands. The armada reached the shelter of the island harbor without a shot being fired.

The rattle of the anchor chains in the hawse pipes had scarcely died away before the troops under full field equipment clambered down the rope nets into the landing barges. Driving rain and high seas soaked most of them to the skin but also assured the absence of enemy air attack. Soon anti-aircraft and coast batteries were set up along the low hills to support the guns on the ships covering the landing operations. Jeeps, command cars, trucks and caterpillar tractors began splashing toward the beach.

There were not enough trucks to go around, but that didn't stop them. From pilot to tail gunner, crews pitched in and carried, mostly on their backs, all of their equipment from the beach to the airfield that was fast taking shape under the noisy pushing of the Engineers' bulldozers and cats. Then for 10 days the men of the Air Force ate out of tin cans and got by with only snatches of sleep.

The expedition landed on a Sunday morning, August 30. The fighter planes—pea-shooters they call them—dropped out of the sky September 11 onto as smooth a runway as could be found anywhere—that is, anywhere in the Aleutians. Two days later came the B-24s. Although the Japs on Kiska did not know it, the mission that paid them that blasting visit on historic September 14 took off from an island airfield that had been nothing but an uninhabited waste of tundra-covered volcanic rock just 15 days before.



That was the occupation of the Andreanofs, which based the Army Air Forces some 200 miles from Kiska Island.

It didn't change the weather. Nothing could change that. But the occupation of the Andreanofs placed the Air Force within fighter striking distance of the Japs in the Aleutians. It permitted scenes like this:

In his headquarters hut on one of the Andreanof islands, Major Wilbur Miller, fighter squadron commander, sat at the end of his cot and leaned against his "desk," improvised from an empty ammunition packing box, while he called the roll from a pocket notebook on his knee. Squadron pilots, many of them with Jap planes to their credit, answered quickly as their names were read off. Stuffing his notebook back in his pocket, Major Miller tore off a piece of wrapping paper from a package under the cot and sketched a rough semi-circle representing Kiska Harbor.

"You all know that harbor well enough by this time," he began in a tone as conversational as though he were outlining a training flight instead of the plan for the next day's mission, "so I won't need a map. Here's the dope for tomorrow.

"We'll follow the photographic ship over and rendezvous five miles southeast of Little Kiska." He outlined a circle route east of the harbor and drew a line. "We'll come in on the south side of Little Kiska," he said.

Now, our objectives are anti-aircraft guns alone this time. The bombers have been getting it pretty heavy and we've got to knock off every gun we can before they come over. We'll have two minutes to get in and out before the bombers are due so we'll have to get out of the way fast."

He looked up to impress his audience and pushed back his fedora hat, with its major's leaf pinned on the front of the round, uncreased crown; it was the only relic of civilian life on the island.

"I don't want anyone wandering around chasing Japs tomorrow," he warned, "so leave the camp areas alone." He joined in the grin that spread around the circle of faces. He referred to an incident which had given the Air Forces its biggest laugh to date. The incident occurred during a strafing raid not unlike the one they were now preparing for. One of the fighter pilots had caught a Jap with his pants down—literally. Winging in low over the camp area on Kiska, he found himself bearing down directly in the path of a Jap dashing half-dressed from a tent and running for more solid cover. The pilot got to laughing so hard at the little figure with the huge strides that he almost forgot to pull the trigger.

"Now for those who weren't over this morning," the Major continued, "the anti-aircraft guns haven't been firing when we come at them. The Japs have been keeping their heads below the revetments until we get past 'em and then popping up to shoot as we're going away. The wing men have got to watch that. When they pop up to fire at the lead plane, the wing man has got to knock 'em down again.

"Joe, you follow me in. We'll go in over the south side of the harbor, circle around and duck out over that ridge just before we get to the head on the north side. We'll circle off shore until the bombers have dropped everything, but don't get away.

"Chuck, your flight will go in over the north head and swing around to come out toward the southwest. Tom and Bill, I want you to be top cover and stick pretty close to the photographic plane. One of those Zeros might get too close. Red, your flight goes straight in for those ships in the harbor. The bombers say the most accurate anti-aircraft fire is coming from that destroyer and that other ship you'll find near it. Come in low, deck level or lower if you can. The Japs can't get those guns of theirs down very well.

"Mac, you're to spend all your time looking for submarine nets. I don't care if you don't fire a shot. Don't, unless someone shoots at you. You fellows with the P-40s will go with a bomber that's to look over Gertrude Cove on the south side of Kiska. Somebody thought they saw a couple of subs in there this morning. If you don't find anything, you can come over and join us. There's a little valley that runs from Gertrude Cove almost over to the harbor, but be careful you don't get tangled up with us. You'd better wait until the bombers have finished and you'll only have Joe and me to watch out for in case we have to come back for another shot at those float planes just north of the dummies. Any questions now?"

"What time do we take off?"

"Who's going?"

The Major pulled out his notebook again and read off a list of names.

"The rest of you will get to go in the afternoon if the weather holds out," he said. "Takeoff will be at 7:15. Be there at a quarter of seven. You can get chow starting at a quarter of six. Any of you that haven't got alarm clocks be sure to tell the sergeant so he can wake you in plenty of time. Now get a good night's sleep."

Next morning, back in the headquarters hut of Brigadier General William O. Butler, commanding general of the Air Force, a little group of officers and enlisted men sat huddled around the radio. On schedule to the minute, they could hear the rasping voices of their fighter pilots, punctured with static, as the pea-shooters dove down over their targets at Kiska.

"Look out, Bill, there's one above you."

"Take that one, Ed, I'll cover."

They drew closer to the radio to try to make out the voices. It didn't take much imagination to picture the hurricane of fire being loosed by the .30s, the .50s and the 37 mm. cannon from the pea-shooters. Then came sharp commands over the radio as the bombers swung into action. A few minutes of breathless, unseen action and then out of a welter of calls, answers and hurried warnings a strange voice was heard clearly.

"Where you going now, Eddie?"

The Jap radio operator on Kiska even had the name right as he tried to draw out the raiders' next move.

There was a fraction of a second of relative silence; then came the answer in an unmistakable Texas clenched-teeth drawl that not even a throat mike could hide.

"None of your goddam business, you Jap ———! I'll blow your radio shack off that damned island."

A torrent of profanity drowned out the static and fairly made the little table radio at headquarters writhe. The General pushed back his chair and threw up his hands. "I thought I knew some cuss words," he muttered.

Then came the Jap voice again, a little less well disguised this time in the heat of the excitement.

"Come back here, you American ———. You die."

"We'll come back, don't you worry. With more bombs, you ———."

Then a sharp call for the PBY rescue ship. The call brought the little group to the edge of their chairs.

"P-39 down just west of Little Kiska," it said.

The group around the radio exchanged glances. That would be almost in the mouth of the harbor.

"Drop a life raft, somebody," they heard next. Then:

"Where is it? Where is it? Can't see it from here."

THE group around the radio at headquarters discussed the chances of the fallen fighter pilot as the planes returned from the raid.

All the B-24s returned; all the pea-shooters but one came back. In little knots along the runway the crews talked excitedly.

"I saw him get out of his ship," said a pilot. "He was floating on his back waving me on but I don't know whether the PBY found him or not. It was pretty close to those guns of Little Kiska."

"Maybe the Japs picked him up," added another. "He came down just outside the harbor."

Lieutenant A. T. Rice, who got two of the five Jap float planes bagged that day, swore softly to himself. "I'd trade the two I got in a minute for the one that knocked him down," he said.

The ground crews were swarming over the pea-shooters, removing empty ammunition belts, checking motors and surveying the bullet holes in wings and fuselage.

"Hey, Sarge, I need a new aileron." A tall, rangy pilot who looked as though he never would be able to fold himself into the cockpit of a P-39, wiggled the left aileron, half shot away by an enemy anti-aircraft shell. "Here's something for the scrap metal collection, Sarge, but the controls worked OK all the way home."

Another pursuit pilot turned over in his fingers a bullet he had fished out of the ammunition compartment in front of the cockpit and whistled softly to himself, "I wonder where that one came from." A slap on the back jarred him.

"Well, Jack, I'll tell you. It came from the late Tom Tojo, or maybe he was Sam Saki, pilot of one Zero float plane just fresh deceased. He's now fish food in Kiska harbor, thanks to your very fine work as a decoy."

"Decoy, hell. I never even saw him. All I saw was tracer bullets whizzing by both sides of the cockpit and I sure pulled in my elbows. Where did he come from?"

His companion shrugged his shoulders. "Search me. All of a sudden he just appeared out of the nowhere into the here, as my Dad used to say to me. He flew right into my sights, practically. One burst did it."

Jack gulped ever so slightly. "Thanks, Pal, I owe you three beers. Those Zeros sure can climb like hell and turn on a dime, but I wouldn't trade this old battlewagon for one of them." He counted an even dozen bullet holes in the wings and fuselage. "Those Zeros can't take it."

On the other side of the landing strip the bomber crews were stretching their legs and sticking their fingers curiously into bullet holes. In one B-24, just above the side gunners' port, there was a hole about the size of a porterhouse steak, the jagged edges curving outward. An ambulance rolled to a stop beside the plane and a leather clad figure slid slowly to the ground from the rear floor hatch. He was holding a bloody rag to his mouth. Two stretcher bearers quickly grabbed him by the arms and placed him on the stretcher.

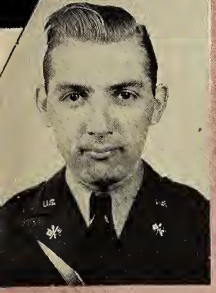
The tail gunner stuck his head out of the side port. "Skippy's all right, fellows, all the Japs got was his moustache. He can grow another one in six months."

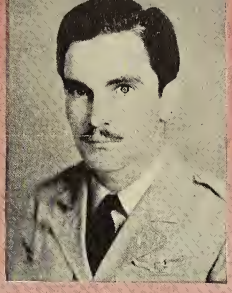
As the stretcher was being lifted into the ambulance, the top turret gunner rushed up.

"Say, Skip, I got that guy. He came up from below shooting into the bomb bay as soon as the doors were opened and was too low for me to get at, but when he climbed around to get on our tail I gave him hell. Have you ever pulled both barrels on a partridge? All you can see is feathers. That Zero got everything I had left, almost 300 rounds, and all you could see was feathers."

So it goes with the Air Force in the Aleutians, day in, day out, in fair weather sometimes, but mostly foul, with no one able to tell from one hour to the next what the weather will be. During the winter months the gale comes in at 100 miles an hour or more, and sometimes it lasts for days.

Not long ago the boys were suggesting that a 500-pound bomb be rigged as a wind sock.





ROLL of HONOR

DISTINGUISHED SERVICE CROSS

MAJORS: G. E. Glober, Floyd J. Pell*. **CAPTAINS:** James J. Bevlock, Jack E. Caldwell, William J. Cummings, Walter Putnam, John P. Randolph, Charles R. Sneed, Henry G. Thorne, George W. Thronbrough*, Donald R. Strother*. **LIEUTENANTS:** John Brownell, Perry L. Franks, Raymond M. Gehrig, John G. Glover, Charles W. Hughes*, R. H. Johnson, Samuel Marett*, Robert F. McMahon, Jack R. Pares*, Elton S. Perry*, Burt H. Rice, Edward T. Sconiers, H. W. Smith, Richard F. Starks (Also Purple Heart), C. B. Walker, William R. Walker. **MASTER SERGEANTS:** Alva S. Hascall, Charles Reeves. **STAFF SERGEANTS:** E. M. Caton, H. R. Inman. **TECHNICAL SERGEANT** C. B. Phillips. **SERGEANT** J. T. Sanford. **CORPORALS:** R. A. Fries, R. L. Holliday, J. D. Lillis.

DISTINGUISHED SERVICE MEDAL

LIEUTENANT GENERAL Henry H. Arnold.

SILVER STAR

MAJOR GENERAL Ira C. Eaker. **COLONELS:** Frank Armstrong, Harry A. Halverson. **MAJORS:** Alfred Kalberer, Frank Sharp. **LIEUTENANTS:** William R. Auman*, Robert C. Brown*, Dean Davenport, P. Dimmit, James Egan, Oliver R. Franklin, Chester J. Kacmarik*, Donald Mitchel, Cecil E. Paterson, Elzae Shahan, Warren Williams, Herbert F. Wunderlich. **FIRST SERGEANTS:** Elwood F. Miller, Carl N. Mosher. **STAFF SERGEANTS:** Jim L. Bragg, Freebourn E. Durrett*, Leonard A. Gallant, Melvin C. Staerk*, James B. Winey. **SERGEANTS:** Worth A. Epling, Joseph Gagnon, Perry Gusic, Robert Kessler, Howard L. Krantz, Robert E. Pledger*, Cecil A. Rogers, Walter J. Sidler. **CORPORALS:** Philip D. Barton*, Clifton C. Heath*, Floyd J. McCormick*, James E. Wood*. **PRIVATES FIRST CLASS:** Robert D. Chapman, Martin T. Grady, Francis J. Teehan*. **PRIVATES:** Kenneth W. Berry, Sanford L. Caviness.

PURPLE HEART

COLONEL Newton Longfellow. **MAJOR** Paul W. Tibbets, Jr. **CAPTAIN** Kermit Messerschmitt. **LIEUTENANTS:** Irving Berman*, Charles Chuteridge, Edwin Cihak, Francis Cornwell*, James P. Ferry, Roy Gallaway, Charles B. Guthridge, Maurice Horgan, Arnold Johnson, Eugene M. Lockhart, Frederick A. Loehrl*, Joseph P. Moore, Winfield E. McIntyre, Jr., Russell O. McKray, Joseph D. Nave*. **MASTER SERGEANT** Fred Peoples*. **STAFF SERGEANTS:** William A. Adams, Eugene Davis, John M. Hughes, William W. Schimke, William J. Watson*. **TECHNICAL SERGEANT** Harry M. Hayes. **SERGEANTS:** Jack E. Falatic, Kenneth R. Gundling, Herman S. Hagg, Harry O. Hill, Farris M. Humphries, Julius L. Kleiman*, Raymond Mayo, Ralph E. Mouser, Orval V. Paul*, Robert F. Price, Frederick J. Rich.

*Posthumous

DISTINGUISHED FLYING CROSS

COLONELS: Truman H. Landon, Arthur W. Meehan, Roger M. Ramey. **LIEUTENANT COLONELS:** Richard H. Carmichael (Also Silver Star), Loren B. Hillsinger (Also Purple Heart), Russell Waldron. **MAJORS:** Jack W. Berry, Paul C. Davis, Marion N. Pharr. **CAPTAINS:** Harry N. Brandon, John Daugherty, Thomas F. Mansfield*, David C. Rawls (Also Silver Star), Harold G. Slingsby, Jack F. Todd*, Warren Wilkinson. **LIEUTENANTS:** Milton C. Barnard, Frank R. Beadle, Roy R. Bright, Barrie Charles Burnside, Carroll J. Cain, John Jarvis Cape, Jr.*, Lester M. Chester, James Alexander Dale, Myron J. Grimes, Harold P. Hensley, Samuel Junkin, Jr. (Also Purple Heart), Paul M. Lindsey, Clarence W. Lipsky, Morris E. Mansell, Jr., Kenneth W. Northamer, Benjamin Pashall, 3d, Levon L. Ray, Hubert P. Sage, 2d, Robert O. Scheible. **STAFF SERGEANTS:** Roy T. Halley, James C. Simmons (Also Purple Heart). **TECHNICAL SERGEANT** Kirby W. Neal. **SERGEANTS:** Christy A. Faith, Gilbert C. Goar (Also Purple Heart), Zackie T. Gowan, Adam R. Jenkins, Jr., William E. McIntosh, Roy T. Nalley, Felix A. Trice, Rudolph Turansky. **PRIVATE** Joseph M. Walsh.

SOLDIERS MEDAL

LIEUTENANT COLONELS: Bernt Balchen, Morris J. Lee. **CAPTAINS:** Philip G. Cochran, Charles R. Fairlamb, J. E. Walther. **LIEUTENANTS:** William N. Boaz, Wesley F. Cummins, Everatt Davis, James A. Hilton, John H. Rose, Ralph G. Taylor, Jr. **FIRST SERGEANT** Ben W. Quarles. **STAFF SERGEANTS:** Ralph F. Asbury, Joseph F. Augustyn, Joseph E. Denning. **TECHNICAL SERGEANT** Billy Gribble. **SERGEANTS:** Morris E. Hicks, Russell J. Liller, Howard C. Muse, Russell E. Robbins, Charles C. Rupert. **CORPORALS:** Merrill R. Hyde, Fred D. Parler, Marvin H. Potts. **PRIVATES FIRST CLASS:** John W. Hamilton, Edwin McC. Fultz, Monroe D. Johnson, Franklin H. Neumann. **PRIVATES:** John Bilinski, Dean W. Bredenkamp, Joseph D. Healy, F. Q. Palombi, John Polychron, Jr., C. F. Santo.

AIR MEDAL

BRIGADIER GENERAL St. Clair Streett. **COLONELS:** C. P. Cabell, William L. Ritchie. **MAJORS:** C. A. Peterson, Robert Alva Ping, Charles F. Stanall. **CAPTAINS:** Robert F. Arnoldus, Marshall A. Elkins. **LIEUTENANTS:** John T. Beals, Edward P. Clark, Carl A. Hansman, Guy C. Kinter, Robert S. Porter*, E. A. McCabe. **STAFF SERGEANTS:** James W. Hemenway, Robert A. Rhodes, William T. Sexton. **SERGEANTS:** Curtiss G. Burgdorf, Robert Fulton, Ritchey H. Thompson, John H. Works. **CORPORALS:** Irving J. Eagle, Robert Kanepi, Bernard F. Hovelmen, Samuel J. Taylor. **PRIVATE FIRST CLASS** Walter D. Conerly.



From top to bottom: Captain Charles R. Fairlamb, Lieut. Kenneth W. Northamer, Major Robert A. Ping, Major G. E. Glober, Major Frank Sharp, Captain Jack E. Caldwell, Major General Ira C. Eaker and Captain Marshall A. Elkins.

The distaff side is fighting too—shoulder to shoulder with men workers in air depots and offices throughout the nation.

WOMEN in the Air Forces

By Charlotte Knight

ALMOST everyone knows about the WAFS —the first women fliers in the history of the Army Air Forces. The announcement that 50 civilian pilots would form the Women's Auxiliary Ferrying Squadron to deliver training and liaison craft from factory to field has aroused nation-wide interest. And justifiably so.

But not so well known is the fact that for every woman flying an Army plane, more than 1,000 women are serving the Air Forces on the ground. That means a civilian army of some 55,000 women behind the men behind the planes.

Personnel officers tell us it is only the beginning. The Technical Training Command, for instance, is planning for the day when 40 percent of all its civilian employees will be women. The Air Service Command estimates that in the future 75-80 percent of the civilian employees in its supply departments, 50 percent in its engineering departments and 80 percent at its Headquarters eventually will be women.

At our huge air depots and busy subdepots former waitresses, now slack-clad and goggled, puncture sheets of metal with powerful electric drills; beauty operators have traded hair-curling gadgets for flaming acetylene torches; co-eds drive "elephant" trains; mothers who not long ago were darning Junior's socks now stitch fabric wing surfaces and pack parachutes; salesgirls and housewives in fume-filled rooms spray paint on fuselages; school teachers operate bandsaws on precision woodwork tasks; high school graduates in their first jobs hammer sheets of tin into ribs, and clean and repair generator cables.

Women dispatchers direct planes in and out of McClellan Field, California. Women teach parachute rigging and teletype operation to the men of Chanute Field, Illinois. Women train as grease-monkeys at Maxwell Field, Alabama. Women study to become radio instructors at Scott Field, Illinois. Women operate printing machines at Duncan Field, Texas. Women repair aircraft radios at Hill Field, Utah. Women serve as dental hygienists at the Santa Ana Air Base. Women train at Bowman Field, Kentucky, and Randolph Field, Texas, as doctors' assistants for actual flight duty in aerial ambulances. Women have taken over the parachute department at Langley Field, Virginia. Women dash about Keesler Field, Mississippi, as messengers on motor scooters and bicycles. Women drive trucks, staff cars, and jeeps at dozens of airfields.

As Air Force procurement inspectors at several aircraft plants, women check the work of other women employees to see that it meets rigid government requirements. Women cartographers and geological survey draftswomen do highly detailed map work. Others serve as meteorologists and weather clerks. At Wright Field's enormous Materiel Center, women work as metallurgists, physicists, aeronautical engineers, chemists, statisticians and economists. As laboratory technicians, they develop pictures in photographic darkrooms, test and analyze materials, conduct experiments with glass and plastics.

Thousands more sit behind typewriters, business machines, telephone switchboards and teletype machines at nearly every Air Force field and station in the country. Camp librarians, service club hostesses, auditors, clerks, bookkeepers. Day-laborers, gardeners, janitors, laundresses, cooks. "Jills of all trades" keeping 'em flying—quietly, efficiently and without fanfare.

A few months ago fliers were astonished to be met by women driving tugs, and grease-smeared ladies in slacks clambering on their planes and taking over. But they are getting more and more accustomed to shouting: "Hey, lady, how's about gassing up and checking the tail wheel?"

The first all-woman aircraft maintenance crew took over a damaged multi-motored plane recently at Ellington Field, Texas. Other fields are following suit. Girl gradu-

Mrs. Pauline Brooks brings patience and skill to her radio repair work.

Miss Virginia Cabell is one of many thousands who work in war offices.

A neat spot welding job is handled professionally by Miss Jeanne Brady. Below, Miss Jackie Hoschall speeds important war messages on their way.

ates of a Texas aircraft school proved to be such capable mechanics that their flying school bosses at Lubbock Field are looking for more like them. Maxwell Field opened the Air Forces' first aircraft school for women last spring. The school now turns out experienced workers who can take a smudge on the chin and like it.

At the Ogden Air Depot at Hill Field, Utah, which serves as supply, repair and maintenance station for the mountain states, you will find more than 2,000 women at work and another thousand in training. You'll see middle-aged women, their faces visible behind plexiglas masks, operating lathes and milling machines, repairing and making parts for the planes their sons are flying. Many of the younger ones get someone to look after the children while they take their places in the aircraft electricity shop, the cloth-cutting rooms and the engineering section. Scores of school teachers from the Rocky Mountain States used their summer vacations to work as classified laborers; some are staying on. You'll see them nailing cases shut, sorting and packing warehouse supplies and keeping hundreds of thousands of machine parts in order as supply clerks and stock tracers.

With few variations, it's the same story at any big Air Force supply station. At McClellan Field women water the acres of green lawns that surround the depot buildings, operate electric mowing machines, and trim the tall evergreen shrubs which give the place a country-estate appearance that belies the activity inside. Between the warehouses, you see girls—"stock chasers," they call them—collecting and delivering supplies from one part of the field to another with small tractors. Out on the runways, other women sit atop tugs, with flag markers in their hands, guiding a plane to its parking space. When the pilot leaves his ship and enters the operations office he is checked in by one of four girls who have the distinction of being the first full crew of women airplane dispatchers in the Nation.

"We're using women dispatchers as guinea pigs," their supervisor explains. "We couldn't get trained men of non-draft status so we decided to try out the girls on a very tough assignment to see if they could take it. They can. We selected these girls from dozens who came in when we sent out the call. We required that they have a good educational background and know how to study, be 25 or under, have emotional stability, better than average tact and an excellent memory. After all, it's up to them to get these planes in and get 'em out again. That's a pretty tall order but these girls have certainly measured up to it, and the results of our experiments should prove to others that women can do the job." Three of the girls are college graduates. One was a school teacher. The fourth is the wife of an Air Forces flier who is on combat duty overseas.

THE foreman in the woodwork section at McClellan points out a diminutive brunette as a typical woman worker under his supervision. "For weeks she spent an extra three hours a night in classes, in addition to working her regular eight hours," he comments. "She is painstaking, capable and ambitious. She's had three raises in the few months she's been working here and now is making about $1,800 a year."

The girl in question is absorbed in an intricate wood pattern, but stops her machine to answer a question. "Dull? Heavens no. This is the most fascinating job I ever had." She points to the blueprint before her. "You see, we are given one of these, and then we just go ahead and make up whatever it says. I really don't know what part of the plane I'm making. But it can't become boring, because as soon as I finish this they give me another blueprint and I start all over from scratch. The toughest part of it was getting used to reading blueprints,

but once you get on to it, it's fun." Here's how a goggled, red-haired, 32-year-old welder at the same field sums up her job: "Whoever said this was a routine job didn't know what he was talking about. I've been a saleswoman, worked in stores and offices and done all sorts of white-collar jobs, but I'll take this any day. I'd like this type of work after the war. The men in this section treat me just like one of the gang and that's what I want."

The blonde working with an electric drill nearby happens to be the national women's pistol champion. In her off-duty hours she organized an auxiliary police squad made up of several women at the field and has taught them the finer points of target shooting.

In a large, sun-lit room upstairs several women sit on high stools bending over flight instruments. With a patience which some women are credited with possessing to a greater degree than men, these girls make repairs and adjustments on delicate pressure and balance instruments requiring 100 percent precision operation. Ticklish work, this. Very little talking goes on in this room; wholesale concentrating doesn't permit it.

In one corner, with a half dozen tiny tools spread before her, a serious young woman is adjusting a bank and turn indicator. She is not to be disturbed. At another bench a woman in her mid-thirties reveals that she sold orthopedic supplies before joining the Air Forces. At the moment she is assembling parts that make up flight goggles and packing them in small containers.

"We have thousands of pairs of goggles to pack and we try to do as many as we can between repair jobs," she comments. "Every once in a while, just for fun, I slip a little note into the box before I close it. Somehow it makes me feel closer to the boys who'll be wearing those goggles...What do I write? Oh, I just wish them luck, that's all."

In the optical section, women work on cameras and camera guns. Several of them in the darkroom have taken men's places as laboratory technicians. They develop and enlarge sections of mosaic negatives from an aerial observer's camera and later piece them together to form a large-scale view which sometimes covers an entire wall. This is not as simple as it sounds and getting these various pieces of an unknown aerial view to fit into a glorified jig-saw puzzle requires considerable skill. The girls have been doing the work for several months now and are as expert at it as the men. "I have a boy-friend in the Air Forces," one of them explains, "and I wanted a job that had to do with flying. This fills the bill."

At Duncan Field, at Sheppard, Patterson, Langley, Will Rogers, the Spokane Air Depot and at several other large stations you find women comprising from 30 to 50 percent of the mechanic-learner classes, and the figure will probably rise sharply in the next few months to meet the increased demands imposed upon the aircraft maintenance division of an air force stepped up to 2,000,000 men. By the end of the year, it is estimated that 50 to 75 percent of the civilians in technical and mechanical positions at these depots will be women. This calls for an extensive training program, now under way in every part of the country. Women who left peacetime jobs, usually in fields widely divorced from the mechanical, are given aptitude tests to determine their skills in metal and fabric work and instrument repairing. Occasionally, classes are conducted right in the shops of the field itself, but more often in nearby cities. The average class lasts about three months. During this time, the students are paid $75 a month, the same as aviation cadets. With the exception of Maxwell Field's school exclusively for women mechanics, most of these classes are co-educational.

The women spend 40 hours a week in classes and in the shops. During two weeks of initial basic training, they are taught the background work they'll need in repairing and taxiing planes. Then they are divided up for specialized training in airplane engine mechanics and sheet-metal work. Instructors have found women apt pupils and willing workers. They are put to work on virtually all jobs except final engine installation and landing gear assembly. Hundreds of depot graduates, who agree to go anywhere in the country, are sent to other fields and sub-depots. Currently, the National Youth Administration also is conducting preliminary courses in aviation mechanics for girls between 17 and 25 at many State centers near large depots. They are paid $10.80 a month plus room and board for four months. After that, most of them are sent to the nearest Air Service Command installation for further training.

An urgent need of the moment is for women radio instructors. They are needed to teach radio operation, radio repair and radio code to enlisted men of the Air Forces Technical Training Command. Many are in training; hundreds more can be used. If they have had previous radio training, or possess a commercial or amateur radio operator's license, they can qualify for a student-instructor's rating. They are sent to Scott Field, the parent radio school of the Army Air Forces, for a three months' intensive course under experienced civilian and Army instructors. They receive $135 a month while training and on graduation are appointed junior instructors at $2,000 a year. Women with more extensive radio experience can qualify for other instructorships at $2,600 and $3,200. It's not an easy life. These women instructors put in seven hours a day, six days a week, on an early shift that begins at the crack of dawn or a late one that doesn't end until 10:30 at night.

In the field of meterology several girls already are working for the Directorate of Weather as "junior scientific aides," compiling weather maps, doing cryptanalytic work, engaging in research on oceanography or making climatalogical studies.

Hundreds of these women workers left comfortable homes to live in over-crowded rooms, vacant school buildings, dormitories or any place they can find, frequently in towns and cities from 5 to 75 miles away from installations where they are employed. Many fields have set up government trailer camps adjacent to the reservation pending completion of housing projects. Hill Field has 300 units in its "trailer town," all of them limited to married depot workers and their families. At Wendover Field, Utah, the housing problem for girls employed at the field was so acute the Army gave single girls permission to rent trailers. Two girls live in each trailer and pay $6 a week rent. They are clean and adequately furnished with a double studio couch, table, chairs, cupboards and kitchenette with running water. Bathing facilities are located in community buildings; water is anything but plentiful and its use is often limited.

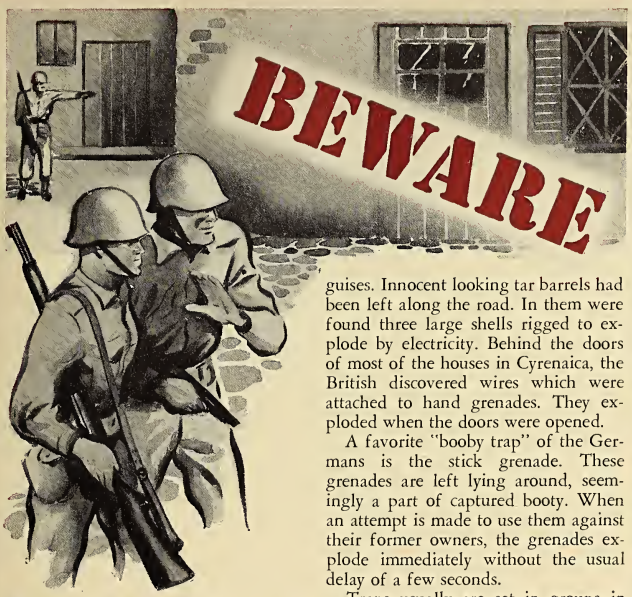
Girls less fortunate than those living in trailers at Wendover have had to rent small, crowded frame motor-court type "houses" for rents of $60 to $80 a month. At present there is practically no recreation for these women when the day's work is over, and the nearest town of any size is 140 miles away. But you'll hear no word of protest. They like to watch the huge four-motored bombers fly overhead and know that they have had something to do with the bombers' being there.

Our Women Pilots

There's no time for glamour in the Women's Auxiliary Ferrying Squadron. The first contingent recently completed a tough, four-weeks' Army-conducted refresher course at the New Castle Army Air Base near Wilmington, Delaware, and are now ready to ferry light planes from plants to Air Force fields.

Women who want to fly with the WAFS must meet the same rigid requirements as regular civilian ferry pilots. They must have 500 hours flying time, cross-country experience, a commercial license of 200 hp. rating, high school education, American citizenship and must be between 21 and 35 years of age. They'll keep their civilian status and will be paid $3,000 a year.

Heading the organization is Mrs. Nancy Harkness Love, 28 year-old pilot who has been flying for 12 years and has 1,200 hours to her credit. Miss Jacqueline Cochran, as director of women's flying training for the Army Air Forces, will train women in cross-country flying as part of a program to create a pool of trained women pilots from which the WAFS can draw to meet future needs.



Booby Traps!

A GERMAN plane brought down over Malta was equipped with a new type of radio. When the British attempted to remove the radio, an explosion killed five men.

A Nazi officer in captured Sevastopol turned on a water faucet in his new headquarters. An explosion ripped out the entire floor.

A British Commando on a raid across the channel kicked open the door of what seemed to be a peasant's home. The entire house blew up.

In each case "booby traps" were responsible. A "booby trap", so named for obvious reasons, is any form of concealed mechanism designed to be set off inadvertently by the enemy or worked automatically by means of a time device. "Booby traps" rely on surprise for their success. Hence, the operating mechanism is either covered or made to resemble some harmless object.

A German whistle was found lying on the floor of an officer's quarters. When the whistle was blown, the vibrating pea hit a striker which caused an explosion. When the British captured Agedabia in Africa, the entire town was mined with both anti-tank and armor-piercing exposives.

In the midst of these contrivances, "booby traps" were found under many guises. Innocent looking tar barrels had been left along the road. In them were found three large shells rigged to explode by electricity. Behind the doors of most of the houses in Cyrenaica, the British discovered wires which were attached to hand grenades. They exploded when the doors were opened.

A favorite "booby trap" of the Germans is the stick grenade. These grenades are left lying around, seemingly a part of captured booty. When an attempt is made to use them against their former owners, the grenades explode immediately without the usual delay of a few seconds.

Traps usually are set in groups in order to reduce the chances of complete discovery. A detected trap is a tip-off that more will be found in the vicinity. Very often an obvious trap is used to mask a well-concealed one nearby. Suspicious signs denoting the existence of "booby traps" include the presence of pegs, nails and pieces of wire or cord for which there is no apparent use, traces of camouflage and withered vegetation indicating some attempt at concealment, indications that an area has been carefully avoided and irregular footprints or wheeled traffic marks for which there is no apparent reason.

What can be done to avoid these death traps? If at all possible personnel of the Engineer Corps should inspect all materiel in newly occupied territory. Engineers are fully trained to locate "booby traps" and well equipped to spring them harmlessly. If engineer personnel is not available, the use of extreme caution and good common sense will go a long way in protecting you from injury. Before entering a house formerly occupied by the enemy, get behind some protection and use a long pole to push open the door. Carefully inspect every object in the house to determine if hidden wires are attached. Don't move any furniture unless necessary. Act on the assumption that every object left by the enemy is a potential "booby trap" and treat it accordingly. If you find anything that looks suspicious, mark it well so that other personnel will recognize the danger zone.

SQUARE PEGS

(Continued from Page 9)

Maxwell Field, when the Pearl Harbor episode took place. Since then, the motto in psychology, as in many other fields, has been "go as fast as you can with what you have."

"What you have" leaves a lot to be desired. Many testing instruments, for instance, require specially-built, delicate timing clocks. At present, it is hard to buy a stop watch. But rapid progress has been made and by now several of the early devices have been replaced by shiny new models carefully designed and engineered to meet the exacting requirements of the research specialists.

Only the ingenuity of the department has enabled it to keep up with the wartime pace. Priorities were hard to get. Commercial orders, when they did arrive, were often inaccurate and useless. A commercial peg board of the type used in factory aptitude tests, for instance, arrived impossibly warped. The psychologists turned carpenters, built their own peg board set to the desired 1,000th of an inch accuracy.

A "sway test" to measure balance and fear of height was rigged up from scrap metal parts taken from the wrecked airplane "graveyard" at Maxwell. Styluses used in the steadiness test were made from ordinary pencils with straightened paper clips substituted for lead.

The use of practical psychology to predetermine the probable success or failure of fliers is not new. Edward L. Thorndike, Professor of Psychology at Columbia University, did extensive work along this line in the first World War. Some tests were developed as the result of his research, but in the post-war clamor for disarmament, the program was dropped.

Now many of the best known psychologists in the country are back on the job. In charge of the Nashville Classification Center, for example, is Major Laurance F. Shaffer, former professor of psychology at Carnegie Tech. Assisting him are men like Captain Frederick Wickert, who received his Ph. D. Degree from the University of Chicago and worked in aptitude testing with Western Electric Company; Captain Lewis B. Ward, Ph. D. from Yale and former clinical worker in this field; Captain Neal E. Miller, former associate professor of psychology at Yale and author of several volumes on the subject, and Lieutenant Frank H. Boring, son of Professor Edwin Boring, director of the psychological laboratory at Harvard University. Most of the enlisted men in the section have M.A. degrees; some have Ph.D's.

The profession which was called upon in the last war to handle the vital, though negative, task of eliminating mental incompetents, now finds its niche in a positive job dealing with the brightest, quickest minds and ablest bodies in the country.

Practical psychology is thus saving the nation millions of training dollars and, more important, saving a maximum number of men for aerial combat by placing them in the right jobs.

PRELUDE TO DESERT COMBAT

(Continued from page 23)

the enemy demoralized by the fury of the air assault, the ground forces can strike home their own blow. Like the hard swinging right that follows the sharp left, the tanks deliver the knockout.

Air support of ground forces consists generally of four phases:

(1) The planned attack where the planes deliver their blow according to the schedules laid out in the combined operations tent of the advancing army.

(2) The attack delivered by the air forces when a ground commander finds himself in trouble and appeals for aid through the air support party travels with a division or a smaller task force.

(3) The "lead-in" attack where high flying, speedy pursuit-type observation planes spot a target and guide bombers summoned by radio to the mark.

(4) The supply support delivered by all types of planes in co-ordinated action.

Of all the phases of air support, probably the most specatcular, from an aerial standpoint, is the "lead-in attack." During one of the later problems of the recent desert maneuvers, this aerial blow was carried out with perfect timing.

A high flying P-43 dodging in and out among the clouds spots a column of dust marking the movement of enemy vehicles. The keen-eyed pilot is baffled by the dust and by the heat distortions. But he feels that the column moving below might be a target. He estimates the length of the column and flies far out of sight and hearing, drops from his high level and returns.

But now he is flying low. Following the contours of the ground, he approaches at an altitude of from 10 to 30 feet. Finally he bursts on the convoy from behind the screen of a low dune. Making a single pass under the protection of his own guns, he verifies the composition of the column.

Is it a target? Is there enough strength present to make it profitable for air attack?

There are tanks, half-tracks, personnel carriers, trucks and guns. Thousands of men on the move.

The pilot of the observation plane pulls away abruptly. He leaves the impression that his is merely a strafing enemy plane. But actually he has a far more deadly mission.

Away from the column he climbs once more, carefully avoiding any contact with enemy planes. Safely free of the area, he radios Air Support Headquarters. He outlines the target, reports its approximate strength, its route and apparent destination. But in the desert rapidly moving armored columns can be lost easily. He is instructed:

"Watch them. At 0945 meet bombers at. . . ."

Back at the airdrome everything is in readiness for a mission. Pilots are briefed and, after an incredibly few moments, the planes take off. Meanwhile, high in the air, keeping out of the way of the enemy aircraft, the observation pilot continues to watch the enemy column, marked by dust. He waits until the last possible moment before leaving to keep his rendezvous.

Finally he departs, meets the attack planes and guides them back. This time when he roars in at 30 feet he leads attack planes loaded with destruction. The blow is struck home hard and—the umpires decide, "bloody."

In this way the enemy can always be kept from moving by day. If he has to move at night he doesn't have the freedom of movement necessary for victory in the desert. And what makes this type of attack especially damaging is the fact that the bombers are always within radio call of Air Support Headquarters. If necessary they can be diverted to other more important targets. It keeps the planes in use, making them an always effective weapon.

ANOTHER important operation is the resupplying of an armored battalion by air. According to one problem set up at the maneuvers, an armored battalion was locked in battle, unable to disengage. Ammunition was running low. Gasoline supplies were fast vanishing. Water and rations were needed.

Over his radio net the ground commander asks for supplies. An air support party with a combat command of an armored division picks up the request, passes it on back to support command headquarters. There, after conferences with Ground Forces, G-3, the decision is made. The battalion will not be sacrificed. It will be supplied by air!

At the airdrome where the big transports are based, a ground supply officer makes up the stores needed to keep the battalion going: one fire unit of ammunition, a day's ration of food and water and gasoline and oil for the tanks and half tracks. The supplies are attached to different colored parachutes designed to aid the ground commander in picking up the most necessary items.

Ammunition goes on chutes of one color, water and rations on another, gasoline and oil on a third. While ground men load the big planes, support command headquarters co-ordinates the operation. Pursuit ships must meet the transports and escort them safely to the scene. Low level bombers are on hand to blast out enemy ack-ack and, then, after the chutes are lowered, to sweep across and keep enemy heads down while the supplies are picked up.

BY NOW the planes are in the air and the ground commander knows that help is coming. He has drawn up his vehicles in a huge oval. The guns of the battalion are all trained outward. He has his panels out indicating the direction of the wind and the path along which he wishes the transports to drop his supplies.

The bombers come over, then the transports, swinging in at 400 feet. From the opened doors come the chutes. They fall in clusters, mostly within the bivouac. The chutes that fall outside are retrieved by tanks which move forward, guns blazing. Men slide from the hatches and double quick their way to the ammunition chutes, dragging them back to the covering tank. Later they will pick up the water, food and gasoline. But first they want the wherewithal to fight.

The attack bombers have kept the enemy down while the ammunition chutes are retrieved. The ammunition is issued and the enemy is driven back sufficiently to permit gassing and distribution of the food and water.

Also, during the maneuver, an "airhead" is established. Transport planes land 100 tons of supplies at an improvised airdrome in the desert flats in an hour and a half. Operations such as this explain the Nazi success in Libya. Our own Army ground-air team is mastering the task.

Excessive temperatures and the constant gritty sand flying about have created a maintenance problem comparable to that experienced in Libya. And competent authorities say that the American desert, on the average, is ten degrees hotter than Egypt.

"Simplest and most important of all the maintenance dodges," Colonel Lee explained, "was one that entailed a little education. We had to teach the pilots to stay out of each other's prop wash. When they get in the wash the intakes fill up with sand. Simple enough, but very important."

There are many other important technical phases of maintenance. But most of them are secret, pertaining to our own equipment. But Colonel Lee remarked:

"Our planes—the ships we've been using out here have stood up very well. We couldn't ask much more than what we're getting in the way of performance."

A mechanic working under lights at night was philosophical. Said he:

"Gotta keep 'em flying. We frequently work all night. But it's worth it to see these babies take off in the dawn ready for anything."

The author, in his flying radio studio.

You Can't Ride the Beam IN COMBAT

Air war in the South Pacific through the eyes of a fighting radioman who was there from the start.

By Aviation Cadet Robert D. Gibson

WE FLEW against the Japs over Bali and Java. They chased us out of Singapore. We ran into them again flying ammunition from Northern Australia to Port Moresby. We were always outnumbered in those early days of the war and, all in all, we took quite a licking. But even then we were sure the Jap Air Force would get a good drubbing before it was over.

My job was radio operator. And I know first hand that a radio operator is a mighty important man on every combat mission. If that sounds like bragging it isn't meant to be. I don't mean just me: I mean every radio operator. And I can show you what I mean.

But that's getting ahead of my story—about seven months ahead to be exact. Back in November, 1941, we left the United States on what was to have been a three-week survey trip of the Ferry Command's southern route to Africa. Seven months and 696 hours of flying time later we arrived back in the United States by boat from Australia. Meanwhile, we had been in Egypt, India, Singapore, New Guinea, Australia, Burma, Java and Bali.

We were in Egypt when we first heard of the outbreak of war. Instructions came through to pick up Lieutenant General Brett in Cairo and take him where he wanted to go. And the only places he wanted to go were where the fighting was the thickest. Before I got into the Army I used to think that Generals stayed a comfortable distance away from the actual fighting. But after being with General Brett, I changed my mind. He is the "goingest" man I've ever met.

We took the General to India and then to Australia where he left us and we went on to Java. That's where the going really got tough. It's always tough taking a beating. But for the number of planes we had down there, we did a lot of agitating.

As radio operator (I was a Technical Sergeant at the time), it was my complete responsibility to guide our plane in and out of the combat zones. The Dutch and British who were operating the anti-aircraft guns had very itchy fingers. If the radio man didn't send in the right recognition signals at the right time, he and his crew would probably be cited for valor, but posthumously. Some of the time, particularly when flying ammunition from Australia to Port Moresby, we flew without a navigator so we could get the maximum amount of cargo into the plane. It isn't cheerful flying without a navigator, but sometimes you just have to do it. And with air raids occurring very often, it was up to the radio man to determine whether we would be coming in under a bombardment.

THERE were three signals we paid special attention to. One was QQW which meant that the sending station was having an air raid alert. The second was a QQQ which indicated that an air raid was in progress. And the most looked for was the QQZ, or "all clear." If the radio man wasn't on the beam all the time, he would be bringing his plane into his station with anti-aircraft firing at him from beneath and Jap bombers greeting him from above.

Even with all our preparation and the constant watching of our assigned frequency, we got into a lot of trouble. I remember when we were trying to get from Rangoon, Burma, to Bandoeng, Java. We told Batavia that we were on our way to Bandoeng. But when we got over Bandoeng we were met with some of the most terrific ack-ack fire we had ever experienced. Bandoeng didn't have a radio, no one had told them we were coming, they had never seen a B-24, and they just weren't taking any chances. They let us have it. The only thing we could do was turn around and go back to Singapore. But that meant danger and it would probably have meant the end of us if I hadn't been lucky enough to have picked up Singapore's radio frequency before we left Rangoon. Actually, there was no official reason why I should have known Singapore's frequency but I had found out long before that you can't know too much when you're in the combat zone. Without those signals, Singapore would have brought us down so fast it wouldn't have been funny. Any unidentified plane, no matter what its insignia, was fair bait.

But to get back to the Japs and the reasons why we think we can take them. First of all, about the much talked about Jap Zero planes. I'd be a fool to say that they aren't any good—they gave us too much trouble for that. They climb at a terrific rate of speed and maneuver with precision. But a couple of bursts and they fall apart . . The Jap plane makers apparently don't have too much regard for their pilots. They were giving them practically no protection and very little fire power. The boys in the later model B-17s don't bother much about the Zeros. What's more, the Zeros don't mess around the 17s. Those Japs look mighty good when they have you outnumbered, but when you are strong enough to fight they often run like hell.

Once over Java we were flying a heavily armored LB-30. Fifteen Japs came down on

us and our gunners opened up. All but three of them left in a hurry, and those didn't hang around very long. The Japs seem to like being heroes but they don't like getting bullets tossed at them.

The Zeros I saw were not particularly fast. One time in an unarmed B-24 on the way to Rangoon, we saw three Zeros about five miles away. Major Paul F. Davis, for my money the hottest pilot in the Far East, pushed the plane down to tree-top level and we started running. They chased us for 50 miles and were still five miles away.

Up in the high altitudes, around 30,000, the Zeros don't have enough soup to make more than two passes at you. They don't like to dive because it's tough pulling their flimsy planes out.

Over Bali one bright morning, a lot of Japs jumped one of our ships out of the sun. Just as one of them came in on their rear gunner, his gun jammed. So he fired his flare gun right in the Jap's face. They never saw one guy get out of a place in such a hurry as that Jap did. On another occasion, the blankets they had piled in back of the ship accidentally caught on fire right in the middle of a fight. They tossed the burning blankets out of the ship and the Japs high-tailed it for home. They must have thought we had a new kind of secret weapon.

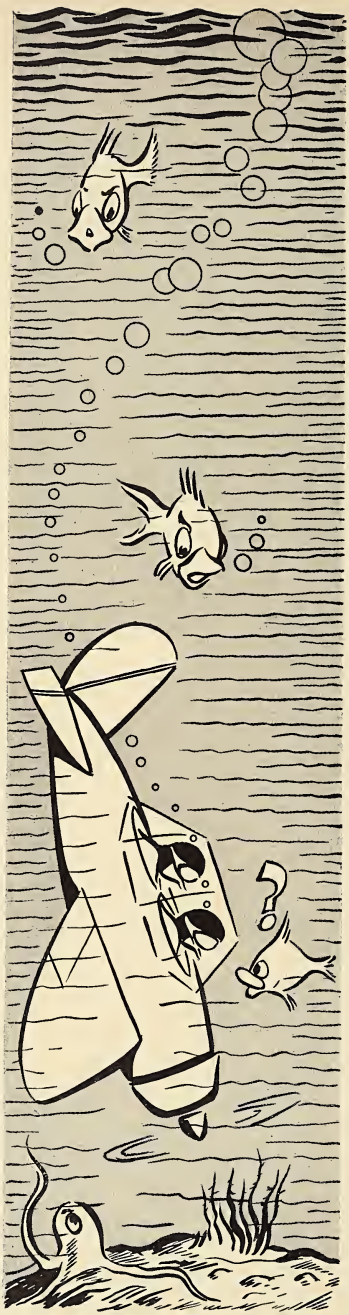
One thing the Japs could do well was strafe our planes on the ground. In the early days, communications were pretty bad and we got a lot of surprise air attacks. It was especially bad around Port Moresby. That New Guinea town is located in a sort of valley with mountains around it. The Japs would come tearing over the mountains before we had an inkling that they were around and they'd give us hell on the ground.

THE Japs did very little night bombing and their bombers seemed slow compared to our models. They invariably flew with a lot of pursuit protection. Their pursuit planes looked mighty potent from a distance—lined up and flying in smart style. But when you went in with our heavy bombers and started blasting away, it was "you take the high road and I'll get to Tokyo before you."

I don't want it to sound as if we can wipe the Japs out of the skies with two 17s and a 24. Many of the Japs are hard, fearless fighters. But when we get anything near numerical equality down there, I'll bet a ten-day furlough that they'll be easy pickings.

Does a radio operator need gunnery training? The answer is that in combat you are a gunner first and a radio operator afterwards. You can't fight this war with dots and dashes. On a tactical mission, you can't have a weak link because the Japs will find it soon enough. Gunnery means self-preservation.

Next to being able to man a gun, the most important job the radio man has to do is to pay strict and constant attention to his assigned radio frequency. This can't be over-emphasized. You have to glue yourself to that frequency even if there is a complete silence. And you have to take it fast. When the sending stations shoot out the information, they don't take a long time to do it. In many cases, they don't have a chance to repeat their instructions, especially when they're telling you there's an air raid in progress.



"I don't care what your altimeter says. I say it's time to pull out."

—BROOKS FIELD OBSERVER

ONE day we were peacefully flying from Soerabaja to Bandoeng. The radio had been dead for a long time. Suddenly, and for no more than a second, the flash came in that they were having an air raid. We had to turn out to sea and wait for the all clear. If any radio man had let his attention wander from that frequency for just a split second, the plane would have come into Bandoeng under a Jap bombing.

Here in the States it's quite different. You can ride the beam and somebody gives you the weather reports. But in combat, you're on your own. And the more able you are to adapt yourself to all sorts of new conditions, the longer you are going to live. Every time you get in a new country, you get a new code to work with. And you have to know it cold. You can have the best damned fighting crew in the Air Forces but if you don't know your code and recognition signals, brother, you're through.

And that business about adapting yourself to new conditions is mighty important. We left early one morning to go from the Gold Coast to El Fasher, Egypt, and we didn't realize we were losing time going east. Before we got to El Fasher it was dark. I took three first-class bearings and El Fasher was completely blacked out only two miles away. They were taking bearings on us but our radio compass wasn't designed to pick up C.W. If he was shooting bearings on us, I figured, why couldn't that situation be reversed? So we turned the plane to the right and our indicator moved to the right. That showed we were going away from the station. We made a 180-degree swing back on course and came right in.

Another time, going from Australia to Port Moresby, we were given just enough gas to make the 800-mile jump in a heavily loaded B-17. It was the radio man's job to bring the plane in. If we varied from the course to any extent, our gas would run out over the ocean. In cases like that the radio man has just got to be on his toes.

Generally speaking, it's a smart idea to have your plane identification down pat. In the South Pacific, some of our planes were scaring hell out of our own boys because they looked like Zeros.

But it wasn't all work. You get your share of laughs. That day off in Darwin, for instance, when we decided to go to the movies. They showed us a James A. FitzPatrick travelogue about Bali. Filmed in peacetime, it ended with the usual—"and now with fond reluctance we take leave of the sunny isle of Bali." Fond reluctance, hell, we took leave of sunny Bali 10 minutes before an air raid.

FORCED LANDING *in the Desert*

WHEN forced down in the desert, *stop and think . . . then act . . . do not become panicky.*

Stay near your plane until nightfall or longer if you expect a search to be made for you. If you have been forced to resort to your parachute, make your way to the wrecked plane if it is not too far distant. Prepare some sort of signalling device such as a piece of fuselage from which the paint has been scraped or a smoke smudge from oil and waste. Whenever possible, hold rockets in readiness.

When absolutely sure that you will not be picked up, decide on a definite plan of action and follow it. Although you may have passed a camp shortly before landing, remember that you were traveling more than a hundred times as fast as you are able to walk. Remember that desert distances are deceptive, don't be fooled by mirages. Make your way toward a known route of travel, a source of water, a point from which you can signal, or an inhabited area. Do not travel during the heat of the day but only at night or in the early morning and late afternoon. Follow the easiest route possible. Avoid soft sand and rough terrain unless it is absolutely necessary to traverse it in order to follow your course. If caught in a sandstorm, put on your sun glasses, cover your nose and mouth with a piece of cloth, and get in the lee of a rock, hill, cliff or some other object.

Do not trust to instinct. Proceed only by instruments of navigation—sextant, stars and compass. Travel light, take only the bare necessities from the plane—all of the water and food, your compass and gun, first aid kit, sun glasses, a knife, matches or a flint and steel, an improvised sun helmet, and a 10-foot square piece of silk cut from your parachute. The sun glasses will protect your eyes from the sun and blowing sand; the piece of parachute silk can be used as a tent to protect you from the heat of the sun and as a shawl at night. Probably the only water that you will have is that in your canteen, so guard it carefully and use it sparingly. If your supply of water is limited, use it only to moisten the mouth and throat at infrequent intervals. —*The Air Surgeon's Office.*

HOW TO KEEP WELL

(Continued from Page 12)

Bathe whenever you can, but remember that the streams, irrigation ditches, and ponds along the coast and in the Nile delta are contaminated with the flukes that cause schistosomiasis. It is not safe to swim or even bathe in this water. However, sea bathing close to shore, where there are no sharks, and away from outlets of rivers, is safe.

You will probably want to shave, but do it in the evening to avoid sun and wind burn. The brushless, rub-in variety of shaving creams require little or no water, and serve their purpose adequately.

Troops in this area should beware of native foods and drinks, even in Cairo. The Arabs are not familiar with our habits or standards of sanitation, and take few precautions to keep themselves or their kitchens clean. Nor do they protect their food from flies, which are a particular menace. Flies live and breed in filth and transmit disease germs by contaminating food.

Fruits and vegetables almost invariably are dangerous because they are irrigated and fertilized with sewage. The safest method of preparation is to dip them in boiling water for a few minutes before peeling them. A strong solution of potassium permanganate can be used if the fruits and vegetables are allowed to soak for a minimum of four or five hours.

The best safeguard is to eat only at Army posts, even when on leave, or in European restaurants that have been inspected and approved by an American medical officer.

Milk should always be boiled, for pasteurization is not commonly employed and many of the dairy animals have tuberculosis and undulant fever.

Food spoils rapidly in this area so be sure that your lunch is made up of staple foods before going out on an operational flight. Thus, tinned foods such as fruit juices and army concentrated rations, crackers and thick-skinned fruits are preferable.

ALTHOUGH the greater part of the territory is a desert area, malaria is prevalent among the natives and should be guarded against by troops. Mosquitoes are found along the coast, river valleys, and not infrequently about oases. In an area where mosquitoes are known to abound, stay indoors as much as possible after dark. Sleep under mosquito netting at night or in a well screened building. Stay away from native towns where the infected inhabitants act as reservoirs of disease, and where many mosquitoes are usually found.

Insect repellents may be helpful but it is best to rely on such safety measures as mosquito boots, head nets and gloves if you are on night duty. Do not wear shorts or short-sleeved shirts at night when living in malaria country.

There are several other mosquito-borne diseases in the Libyan Theater including dengue fever and filariasis, for which the same precautions are applicable. Sand fly fever is also common, and although neither it nor dengue are fatal diseases, they are capable of prostrating a large part of a command for a week or ten days.

With the exception of the upper class Egyptians, the native people have little interest in personal cleanliness. Many of them have scabies and are infested with lice. It is well to stay out of their homes, for they are frequently filthy. There is a great danger of contracting typhus fever during the winter months from associating with the individuals infested with disease carrying lice.

PROMISCUOUS women are frequently encountered, especially in Cairo and Alexandria, both as clandestine pick-ups and as professional prostitutes. The majority of these individuals have venereal diseases. Ninety percent of one group of prostitutes were found to have venereal disease, the majority having all three of the common diseases: syphillis, gonorrhea and chancroid.

The temperature varies greatly in north central Africa. Even during the hot season nights can be so cold that blankets are necessary. The discrepancies between ground and air temperatures add an additional problem to flying personnel. Even though it is 130 degrees in the plane on the ground, temperatures in the forties and fifties or lower will be encountered at relatively low altitudes. When an over-heated and perspiring pilot passes through this degree to temperature change in a few minutes on ascending, he will become chilled and be apt to develop a cold or even pneumonia unless he is careful to arrange his flying equipment so that varying degrees of warmth can gradually be added. Excess perspiration should be wiped off prior to donning a flying suit.

Minor cuts and abrasions become infected easily and frequently develop into seriously disabling injuries, so that immediate first aid treatment of all cuts, burns, abrasions, and mosquito bites—no matter how small—should be applied. More serious injuries should receive attention as soon as possible.

The extremely hot sun during the summer months makes it difficult for one who is accustomed to the climatic conditions of the United States to evaluate the intensity of the sun's rays. Consequently, serious burns may be acquired after relatively short exposure, and the glare of the reflected light from the desert often results in serious eye irritation. This, coupled with the mechanical irritation produced by wind and blowing sand, makes it necessary for all personnel to wear protective goggles at all times, even when on land.

A thorough knowledge of the dangers you face and a determination to take all personal precautions to guard against those dangers will go a long way toward keeping you physically fit to do the job assigned you —and do it well.

Information on Desert Operations may be found in FM 31-25.—The Editor.

"WE'LL GO BACK SOME DAY..."

(Continued from Page 10)

side. I felt terrible. Then it landed and Fritz climbed out grinning. I have never been so happy in all my life."

"Landing was purely a matter of luck," her husband commented. "I had almost no control on the elevator and rudder. The only reason the tail settled after the wheels were down was that my mechanic had made a mistake that morning and trimmed the plane very tail heavy. Later we counted 300 bullet holes in the plane plus some big cannon shell holes."

On the last day of 1941 the first American B-17's from the Philippines arrived at Lieutenant Den Ouden's base in Borneo.

In January, after the big attack on the Indies proper was launched by the Japs, Lieutenant Den Ouden's flight was officially credited with sinking four transports and a light cruiser during the landings on Tarakan. Later in the month the remnants of the Dutch East Indies Air Force—15 bombers and 16 fighters—went into action with the U. S. Army Air Forces over the Straits of Macassar.

"It was the first time we ever had fighter protection, so we felt very good," said Lieutenant Den Ouden. "On that first mission our objective looked like a fleet review—three rows of cruisers and transports—26 in all—steaming toward Balikpapan, an important oil center on the Borneo coast.

"We made our runs through the thickest anti-aircraft fire I have ever seen. Aided by our fine German-made bombsights, we hit a heavy cruiser with two 1,100-pound bombs. A heavy explosion followed. The ship was enveloped in black smoke and it toppled over in less than two minutes. Meanwhile, fighters dive bombed and strafed the transports. That was our best day. Our bombers made 12 direct hits on eight ships. We sank one heavy cruiser, one light cruiser and two transports, set afire one destroyer and damaged two large transports, one of which was beached and the other abandoned.

"We had no armor so we used sections of steel from oil drums and even the heavy base plate of electro-motors to protect our pilots and gunners. We had to play hide and seek with the Japanese planes that tried to bomb our camouflaged airdromes. Only by outguessing them did we survive.

"Japanese pilots are tricky. Often they faked attacks to draw fire from our gunners. When the gunners bent down to feed a fresh pan of cartridges into the gun, the Jap pilots would flash in to attack. We fooled them by bending down before the guns needed reloading and then catching the Zeros with a burst as they closed in.

"One Zero pilot we shot down was found in his cockpit wearing a large Japanese flag under his flying suit, wrapped around him like a sarong. An ME-109 pilot we brought down had big feet and blonde hair. He must have been a German."

By March 3 all Dutch bombers were expended and three days later Lieutenant Den Ouden left the Indies for Australia.

Lieutenant Simon reported for duty with a fighter squadron on January 26 without ever having flown a modern high-speed pursuit plane. He finished his advanced training with loaded guns over Soerabaja within range of the Japanese carrier-based Zeros. Later, his squadron of 12 Brewster Buffaloes was shifted to Bandoeng, where it formed the sole aerial defense of General Wavell's headquarters.

"In our first battle we met a sky full of Zeros right over the General's headquarters," Lieutenant Simon related. "We were caught by the top cover of Zeros as we dove to attack a group below. I remember shooting many times and being shot at. Then all of a sudden the sky was empty and I was all alone except for a few planes in the distance. I was disappointed because I didn't think we had shot down any Zeros, but the next day our ground patrols found the wrecks of five Jap planes.

"In the battle of the Java sea we flew escort for an American dive bomber squadron—three dive bombers and 20 fighters—to attack the big Jap transport fleet. We had eight American P-40's, seven Hurricanes flown by Dutchmen and five Brewsters.

"That day we saw a sight none of us will ever forget. Below, the Japanese warships were racing around the edges of the convoy spouting flame and smoke and leaving long white plumes of spray in their wake. In the haze of the setting sun we could see the long rows of transports steaming along in perfect battle order. It was a terrible and a beautiful sight.

The dive bombers sank one transport. When we landed we all looked at each other, everybody thinking what would have happened with 300 dive bombers instead of three. But thinking didn't help us any. We took a drink and went home.

"The next morning, with the dawn at our backs, we skimmed the water raking the landing barges along the beaches. We could see the soldiers dive over the sides as our bullets hit the barges and silenced the anti-aircraft guns in the stern of each barge.

"Within two hours after we landed from that mission, the Americans were ordered to leave Java. Two days later we had only one fighter in shape to fly. The battle of the Indies was over for us.

"We had too few planes and what we had lacked performance. But they were sturdy and never fell apart in the air under the heaviest fire. I have seen planes land with 20-inch holes in wings and rudders, with windshield screens shot away, tires punctured and holes all through the fuselage. It was amazing. All those planes needed to be perfect was a few hundred more horsepower and additional guns."

Lieutenant Arens was a veteran KLM pilot in the Indies before he went into action against the Japs. (He is now the personal pilot of General Van Oyen.)

To keep Jap fighters away from his unarmed plane, Lieutenant Arens painted the rear of the fuselage to resemble a plexiglas gun position. He then inserted two five-foot lengths of lead pipe so they stuck out behind the tail like a pair of machine guns.

When the Jap fighters steered clear of the "tail stinger" and made beam attacks, the crew of Lieutenant Arens' Lodestar poked machine guns through the cabin windows and blasted away. Three Japanese Zeros fell victim to this tactic while avoiding the lead-pipe "tail guns."

Lieutenant Arens delivered his cargoes of food, cigarettes, gasoline, ammunition and parts to bases scattered through a chain of islands that stretched one and one-half times the distance from New York to Los Angeles. When there was ammunition or gasoline aboard, Lieutenant Arens' gunners gave the tail "stinger" a fresh coat of paint.

The Lieutenant's final flight out of Java, the last from the island, was a classic. Passengers aboard his Lodestar included wives and families of high Dutch colonial officials and officers. Lieutenant Arens took off at night. As he passed over the Japanese-held airport at Palembang, he saw row on row of Japanese planes parked on what formerly was his KLM home base. In the bright moonlight the planes made a perfect target. It was three o'clock in the morning and there was no indication the Japs had even heard his plane. He couldn't resist.

Lieutenant Arens signalled his crew. Passengers were strapped in their seats with safety belts. Gunners manned the cabin windows. Lieutenant Arens poked the Lodestar's nose down toward the moonlit field. Down he went sashaying across the field to give gunners on both sides a shot at the parked planes. Inside the transport, passengers were screaming and airsick. Outside, Japanese planes burst into flames. The garrison awakened to a tardy alert.

With throttles wide open and the wheel pulled back against his chest, Lieutenant Arens lifted his Lodestar up and away, Australia bound.

"It was one time we caught the Japs asleep," Lieutenant Arens recalled. "Palembang was my home for years. I would like to go back there again some time. It was a lovely place."

A Report On A-20 Action in Russia

By Major Vladimir Zemlyanoy

Russian Air Force

Special to Air Force *by Cable*

On the southern sector of the Soviet-German front, American bombers of the Boston III type have proved effective as attack planes in low altitude missions against German columns and troop concentrations and on enemy aircraft at airdromes.

Russian pilots find the Bostons greatly enhanced as fighting weapons when bombing is combined with strafing of enemy ground forces. Also, by suitably maneuvering, our Boston pilots can attack and bring down enemy fighters.

Using combined bombing and strafing tactics, Pilots Sirokin, Glusnov and Bloch in one flight alone recently set 15 German aircraft afire. In repeated action over several days, Captain Ossipov's squadron, flying Bostons, have destroyed 82 tanks, 247 trucks, 3,000 German soldiers and 7 bridges by such low altitude tactics.

This low flying has many advantages, and it preserves the element of surprise. Flying at low altitude makes it possible for our pilots to attack in bad weather under cover of low-hanging clouds. Thus, besides bombing, our pilots are able to fire point blank at the enemy with machine guns.

In view of these considerations, the armament of these planes has been somewhat modified in order to increase their firepower. The small caliber machine guns installed on Boston III's have been replaced by large caliber guns. Other details have been altered to increase bomb load and the number of bombs that can be dropped in series. The latter is highly important in bombing ground troops, especially columns on the march. New large caliber machine guns also give the Bostons better protection against enemy aircraft. It is only with such armament that our gunners can maintain fire against German Messerschmitts. Captain Ossipov's Boston squadron has shot down eight enemy aircraft.

Russian pilots flying American planes are constantly seeking new forms of combat tactics in an effort to achieve maximum effectiveness in every battle flight.

(The Boston III described above is the British and Russian designation for the Douglas A-20 light bomber.—The Editor)

PICTURE CREDITS

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All other photos secured through Official Army Air Forces sources.

On Shining Shoes

By Pvt. Dennis Wiegand

Oklahoma City Air Depot

Although I could probably make a lot of money by patenting my specially developed method of shining shoes, I am happy—in the interests of comradeship and a mutual dislike for K.P. duty—to pass my secrets on to you.

You probably received your first hints on the gentle art of shoe shining from that delightful character, "Old Sarge." There's at least one in every outfit and he knows all the questions before you get a chance to ask for the answers.

Old Sarge will tell you, in that imposing way of his, to get a bucket of water, a cake of sandsoap and a G.I. scrub-brush. Then you are supposed to scrub your shoes down to the bare leather. Naturally, this "G.I.ing" process injures the delicate tissues—or something. At any rate, you hear a lot about it, not to mention the added touch of sprinkling a few drops of water on the shoes before giving them the final brisk rub-down. Probably Old Sarge will mutter something about toning up the job by rubbing a few drops of glycerine over the fresh polish.

But the Army knows some of the answers, too, and new shoes are not finished as they are just to get you used to the feel of a G.I. brush. And now, after a four-month period of research, I seem to have proved that only the hard original surface of your G.I. shoes will take a deep polish. Leather softened by scrubbing and the use of saddle-soap will take a gloss or even a good sheen, but never that glassy glitter.

Some of the fellows have these fancy so-called shoe-shine kits with enough tins of paste and polish and enough brushes and daubers of all kinds and sizes to keep a cavalry regiment glistening. Of course this "remote control" method of polishing is good enough for a mass-production job. It'll pass inspection every time—but give me an old woolen sock for that fine hand-polish. Grapple that shoe with nothing but an old woolen sock between you and it and the can of polish. That's the secret of success.

For one thing, no one ever invented a dauber that would spread polish as evenly as the fingertips employing a gentle, rotating motion. And in the second place, a shoe-brush will always leave tiny grooves and scratches in the basic polish. You can't lay down that mirror-like finishing coat on a dull, scratched base. Moreover, these dark brown glosses you see around aren't strictly G.I. The G.I. brown has a slightly reddish tone preserved under a transparent glassy surface approximately $\frac{1}{32}$nd of an inch thick.

Of course, I don't wear the shoes I've been talking about. I used to when I was taking my basic training but I goldbrick in an office now and most of us here find it more convenient to buy oxfords. My two pairs of G.I. shoes are reserved for inspection only. The soles and heels of one pair are pretty far gone, but they put up as good a front today as they did back at Fort Snelling the day they stopped the Major. They outshone over 1,000 pairs of shoes that day. They may be a little over-polished now—that can happen, too. But you can't detect a case of over-polish unless you get down on your hands and knees and inspect the edges of the stitching.

There's always the hope that some day we'll have a General making a tour of inspection. And maybe the sun will catch my shoes just right. He may even order new shoes issued to me; and order my old ones displayed in a glass case with a placard reading, "All Military Personnel Will Note: These Shoes Are Strictly G.I. And For Your Future Guidance."

Well I can dream, can't I!

Is there a MEKIWI* on your field?

*MEKIWI (Mechanical Kiwi) is our name for a plane that has been grounded—mechanically unfit to fly because someone pulled a maintenance boner, failed to clear up a maintenance bottleneck, fell down on the all-important job of inspection, or failed to read and follow Tech Orders.

Airplanes are made to FLY! However, some do . . . and some DON'T! Most planes that WON'T fly are man-made MEKIWIS!

Good planes can—and do—become MEKIWIS because of a thousand and one careless maintenance and administrative mistakes. YOU know what these boners are and YOU know how to correct them.

Send us your ideas on improving maintenance. Your tips will help others!

** Pronounced "MEK-KEE-WEE".*

GET THE MEKIWIS OFF THE GROUND!

ANSWERS TO QUIZ

on opposite page

1. (b) Congressional Medal of Honor. Others in order of rank are: Distinguished Service Cross, Silver Star, Distinguished Flying Cross.
2. (d) Russian attack bomber.
3. (a) Scott Field is nearest to Belleville, Illinois.
4. (c) Major.
5. (b) Draws maps or charts.
6. (b) To compensate for a plane's change in balance.
7. (c) A single place, single engine pursuit plane.
8. Reading left to right: Airacobra, Messerschmitt, and P-40. (If the middle plane fooled you, it's a Messerschmitt that was captured and repainted with British markings.)
9. (b) Human correctible failures.
10. (b) Project the flat surface of aerial photographs into third dimensional relief.
11. (c) A squadron. A squadron is the basic administrative and tactical unit; a flight is the basic tactical unit consisting of three or more planes; a group is both tactical and administrative containing two or more flights; and a command is both tactical and administrative with two or more wings or groups of the same class of aviation.
12. (d) A painted circle marked on the concrete apron at airports indicating the points of the compass.
13. (b) See that the chocks are under the wheels or that the brakes are locked.
14. (b) Below the stratosphere.
15. (c) A mountain range in New Guinea.
16. (c) Turn right.
17. (False.) U.S.S.R. is the abbreviation for the Union of Soviet Socialist Republics.
18. (False.) Don't take hold of the rip cord until you are out or you might open your parachute while still in the plane.
19. (False.) The bombardier sometimes gives orders to the pilot, usually when lining up a target.
20. B-25.

On Giving Orders

From the equivalent of a regimental command down, the Germans prefer verbal rather than written orders, given in the presence of all unit commanders, to facilitate coordination and save time. The local terrain should be well known, independent of maps, and orders should be given in accordance with the terrain and not with the map. As an aid to clarity, the commander should place himself in the position of the receiver of the order.

What's your AIR FORCE I.Q.?

TEST your knowledge with this AIR FORCE quiz. Score five points for each question answered correctly. 50 is terrible; 60 means back-to-the-books; 70 is passing; 80 is damned good; 90 and you're excellent. If you make a 100—we'd like to see your idea of a quiz. Answers are printed on Page 40! No peeping. Ready! Contact!

1. *The highest award which can be won by a member of the Army Air Forces is*

a. Distinguished Flying Cross
b. Congressional Medal of Honor
c. Distinguished Service Cross
d. Silver Star

2. *A Stormovik is*

a. A German paratrooper
b. A Russian drink
c. A wind tee to measure storm velocity
d. A Russian attack bomber

3. *Scott Field is located nearest to*

a. Belleville, Illinois
b. Shangri-la
c. Rantoul, Illinois
d. San Antonio, Texas

4. *In the R.A.F., a Squadron Leader is equivalent to our*

a. Lieutenant b. Captain
c. Major d. Lieutenant Colonel

5. *A Cartographer*

a. Manufactures automobiles
b. Draws maps or charts
c. Draws cartoons
d. Carts graphs to overseas units

6. *Trim tabs are used*

a. To give the plane its forward pitching movement
b. To compensate for a plane's change in balance
c. To help gain altitude quickly in a plane
d. To keep tab of the trimmings you take in poker

7. *The German Focke-Wulf 190 is*

a. A two place, single engine pursuit plane
b. A medium bomber
c. A single place, single engine pursuit plane
d. A heavy bomber

8. *Identify at least two of the planes pictured below:*

9. *Eighty percent of Army aircraft accidents in the United States are the result of*

a. Poorly equipped planes
b. Human correctible failures
c. Lack of instruction
d. Bad flying weather

10. *The stereoscope is used to*

a. Determine heart beats
b. Project the flat surface of aerial photographs into third dimensional relief
c. Adjust pitch propellers and control delivery of de-icing fluid
d. Determine the amount of oxygen in the bloodstream

11. *The basic tactical and administrative unit in the Army Air Force is a*

a. Flight b. Group
c. Squadron d. Command

12. *A compass rose is*

a. A pink rose of the American beauty family
b. The method of determining compass variation and deviation
c. A compass container
d. A painted circle marked on the concrete apron at airports indicating the points of the compass

13. *In making a pre-flight inspection check of a plane the first thing to do is*

a. Locate the fire extinguisher and first aid kit
b. See that the chocks are under the wheels or that brakes are locked
c. Check the ignition system and see that it is off
d. Warm up and check the proper functioning of the engine and check the control services and the instruments

14. *The troposphere is*

a. Above the stratosphere
b. Below the stratosphere
c. Some place in Russia
d. Six miles due west of New Zealand

15. *Owen Stanley is the name of*

a. The donor of the ice hockey cup
b. The man who found Livingston
c. A mountain range in New Guinea
d. Assistant Secretary of War for Air

16. *In routine flight when approaching a plane head-on you should*

a. Go over him b. Go under him
c. Turn right d. Turn left

TRUE OR FALSE?

17. *U.S.S.R. is the abbreviation for United States of Socialist Republics*

a. True b. False

18. *Before making a parachute jump you should grasp the rip cord while still in the plane.*

a. True b. False

19. *The bombardier never gives orders to the pilot*

a. True b. False

20. *The plane below is a*

a. Martin B-26
b. North American B-25
c. Lockheed Hudson
d. Curtiss Commando

Printed in U.S.A.

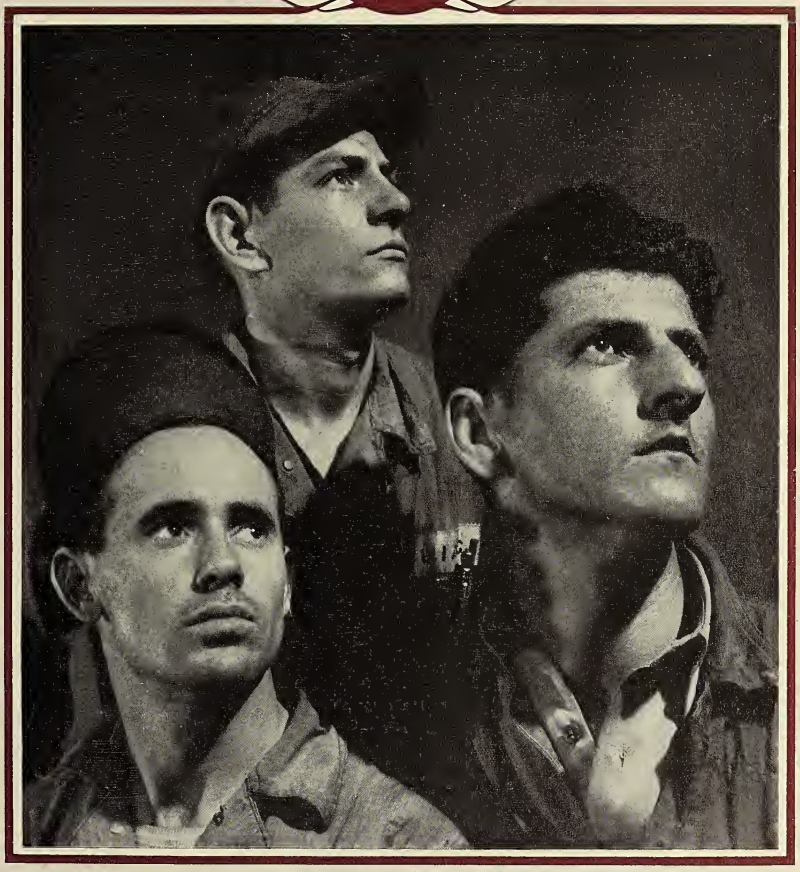
Don't pay for your ride with CARELESS TALK!

REMEMBER . . .

WHEN YOU OPEN THE DOOR —SHUT YOUR MOUTH!

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES



"Sweating Out" Their Ship

JANUARY 1943

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AIR FORCE
OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

January Brief

This Month Air Force introduces a new department, On the Line (Pages 20 and 21), which will appear each month in the interest of better maintenance of Air Forces equipment. The maintenance mistakes featured in this new department may appear more humorous than helpful at first glance. But, as one of the crew chiefs who helped set up the picture put it: "Say—I'm kidding, but in earnest. These mistakes happen every day." You'll see what he means.

The Front Cover Picture and the picture on the inside back cover are the work of Private Roger Coster, Air Force staff photographer.

Rated among the top photographers of Europe before the war, Private Coster served 18 months with the French Infantry and saw 45 days' action against the Germans on the western front.

Released from the French army on a medical discharge, Private Coster returned to his home in Paris, only to leave again, just 24 hours before the German army entered the city.

Private Coster landed in New York City in April, 1941, after photographing his way through Portugal, later Brazil. He entered the United States Army on September 22, 1942.

Major General Ralph Royce whose article on air operations in the Southwest Pacific appears on Page 15, commanded the Northeast Air Area in Australia before taking up his present duty as Commanding General of the Southeast Army Air Forces Training Center, with headquarters at Maxwell Field, Alabama.

Last April, from Australia, General Royce led a flight of three B-17s and ten B-25s on a 4,000-mile bombing raid on shipping, airfields and other Jap-held points in the Philippines.

With Aircraft approaching the speed of sound, the technical but highly fascinating subject of compressibility becomes more and more important, particularly to the boys who fly the high speed equipment. This month's Air Force introduces compressibility and its basic principles in an article by Colonel Ben S. Kelsey, now working on special projects for the Chief of the Production Division, Wright Field, Ohio. Two succeeding articles will take up the effect of compressibility on aircraft operations and its relationship to aviation engineering and design.

Captain Harold R. Hansen who takes you along on an Army acceptance flight of a B-17 in his article on Page 29 had his first real urge to take to the air in 1926. Private flights cost about $20 each in those days so he kept his money in his pocket and enlisted in the National Guard Air Corps. He not only got his plane ride but has been flying ever since, is now Army Production Engineering Officer (and chief Army test pilot) at the Boeing Aircraft Company's plant at Seattle.

When Called to active duty from the Air Corps Reserve last March, Captain Jon A. Laird was flying DC-3s over the New York-Miami run for Eastern Air Lines. In the Air Forces he continued to fly DC-3s but they were converted for cargo service and he was flying them "over the hump" across the Burma Road in ferrying supplies from India to China. His experience while on that assignment form the basis for the article on Page 31.

Air Force is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

FORMERLY THE AIR FORCES NEWS LETTER

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IN the Army you "sweat out" everything from chow lines to promotions.

That is, you worry it through until you get some kind of answer, whether it be food or another stripe.

When maintenance men of the Air Forces sweat out their ship, what occurs is something you can't write into Tech Orders no matter how hard you try.

Sweating out is more than just searching the sky for your plane. It is having the personal interest in a machine and the concern for its crew that goes beyond duty and beyond orders.

All over the globe our ground men are sweating internally, you might say, for the successful mission and safe return of the planes they work on.

The three mechs on the cover are actually (left to right) Sergeant Hugh D. Smith, Staff Sergeant James E. Williams and Technical Sergeant James H. Gardner, all attached to a medium bombardment squadron at Mitchel Field, N. Y.

But we might have picked at random any three maintenance men out of many thousands in the Air Forces and put them in that picture. For ground crews are the same the world over. And they are sweating out a lot of planes into fighting shape in a lot of theaters, and here at home as well, despite weather and the enemy and spread-out supply lines.

At the moment, for instance, headlines feature the North African scrap. But headlines seldom, if ever, tell about the fight going on in the desert theater to keep aluminum and steel and wood and rubber in flyable shape at all times.

The headlines don't tell about the talcfine sand that sometimes gets as high as 9,000 feet in the air, about how every time an engine turns over it draws through its intake an abrasive that eats into pistons, bearings, gears and every mechanical part as effectively as emery dust. Or how sandstorms present additional problems; in fact, each time a squadron takes off from a desert field it does so in a sandstorm—one created by the prop wash.

And sand is only one headache for the maintenance men in North Africa. Extreme changes in temperature make it tougher. (Weather conditions in the North African theater are described in detail on Page 11.) Many plane parts, good for 500 hours under normal conditions, are often good for only 50 hours because of the North African climate.

Our best engineers have studied the North African situation to the last lock-nut and as a result many ingenious devices have been adopted to solve the maintenance problems over there. But the real answer lies with ground crews themselves, with the guys who have their own private battle to fight and their own sweating out to do so the main show can go on.

AND speaking of maintenance in North Africa, our damaged planes are being carried off the field of combat in the desert area almost as carefully as are our soldiers. The reason is a huge salvage trailer now being employed to transport damaged planes in the desert.

The trailer bears the name "Queen Mary." With it a damaged plane can be transported from the point where it has been forced down to the nearest place where repairs can be made. The damaged plane can thus be dis-assembled, its component parts carefully wrapped to avoid further damage enroute, and the plane can be carried bodily off the field in such a way that it will be ready for combat again in the least possible time.

Crews of the mobile repair units which include the Queen Mary's are picked men. They have to be. They must be able to work rapidly and efficiently under cover of darkness, must be able to defend themselves as best they can if attacked by enemy planes or ground troops. Most of all, they must have a high degree of ingenuity to tackle the problems that come along. For seldom are two salvage operations the same.

It's possible that before the present scrap is over in North Africa this huge salvage trailer will steal away the title "Ship of the Desert" from the camel, which has had that moniker for centuries.

NEW courses, leading to a commissioned status, in meterology are now open to enlisted men under a program inaugurated by the Weather Service of the Air Forces for the training of high school graduates and college freshmen and sophomores to become Weather Officers.

Satisfactory high school or college work in mathematics and science, especially physics, is a prerequisite. High school students will be given a one-year pre-meterological course and college freshman and sophomores a six-months course.

The new courses are in addition to the Aviation Cadet course in meterology. Inquiry about any of these courses should be addressed to the University Meterological Committee, University of Chicago, Chicago, Illinois.

FOR the Fifty-Fourth Fighter Group:

"Happy landings. On your leaving, this Air Force joins with me in admiration for

your performance in combat after long over-water flights; for maintaining your airplanes in fighting condition with few mechanics, without a forced landing chargeable to poor maintenance; for the long and weary days of constant air alert over our farthest advanced bases; for the way you have proved that you can take punishment and inflict it on the Jap. When next you meet the enemy, we will be watching and will take pride in your brave action. With you we honor the memory of Major Wilbur Miller and the others you leave forever here. This will be published in General Orders as a permanent record of the achievement of your Group."

(The above is a paraphrase of the message sent recently to the 54th Fighter Group from the Commanding General of the air force to which the 54th had been attached. For security reasons all reference to the theater, air force and the Commanding General concerned have been deleted.—Ed.)

BOMBARDIERS have a lot of stuff to remember. You might be interested in knowing that the twelve major correctible errors which creep into bombardiering can be summed up as follows:

1. Failure to make a pre-flight check.
2. Failure to lock and unlock racks.
3. Selection of wrong target.
4. Failure to inspect bombs before take-off.
5. Failure to turn on rack switches.
6. Poor knowledge of identification of enemy submarines and surface craft.
7. Accidental release of bombs.
8. Failure to check oxygen supply and equipment.
9. Failure to turn on bombsight switches.
10. Rapid and jerky operation of correction knobs.
11. Incorrect altitude computation.
12. Entering incorrect data in bombsight.

COLONEL L. H. RODIECK, a member of General Marshall's staff, told this one after a recent tour of the South Pacific theater:

"During dinner we heard two B-17s coming in and we dashed out to meet them. Colonel Saunders (Col. Laverne G. 'Blondy' Saunders, commanding heavy bombers at an advanced base in the Solomons area) meets every one of his planes as it lands.

"He was out there when the ship stopped rolling. He was tickled to death to see them and the young pilots were tickled to death to be there. He wanted to know if they had done any good. Well, they had done some bombing, but they didn't know whether they had done any good or not. He then asked if any Zeros had attacked them. " 'Yes, but they didn't do a bit of good. About eight of them hit us, but we only got three of them.' That is very poor, they think, over there.

" 'Did they hit you at all?' he asked.

" 'No, sir. Not a hit.'

" 'Are you sure of that?'

" 'No, sir, they didn't hit us.'

"Colonel Saunders asked 'What are those holes there?' pointing just back of the bomber's door.

"About this time one of the mechanics came out. 'Oh, Colonel, you don't count *those* holes,' he said. 'Those are little bitty holes. We got those ground strafing on the way back.' "

THE Wings Club of New York City, recently given official representation and recognition by the Assistant Secretary of War for Air and the Commanding General of the Army Air Forces, is anxious that its membership should include all officers of the Air Forces. Membership may quite likely prove of benefit to our officers, particularly those visiting New York and London, England.

There are no initiation fees and no dues for members on active duty in the Air Forces except during periods when the clubhouse facilities are being used. Dues of $2 for any 30 consecutive days are then in effect.

The Wings Club has acquired club rooms and admissions to all the facilities of the entire 22-story Yale Club building at 50 Vanderbilt Avenue in New York. And that means the works—hotel accommodations, recreation facilities, gymnasium, theater tickets and travel service, restaurants, and all the rest. The club has a reciprocal agreement with the Royal Aero Club of London. For more information you can write the club at its New York address.

MASTER SERGEANT HARRY DARBY, sergeant major of a base tactical group at March Field, Calif., is credited with thinking furloughs are great—for the other guy. It's part of his duties to approve furloughs, but although he joined the Army 25 years ago Sergeant Darby has never had a furlough himself, and has never asked for one. We don't know about this one. We just don't know.

THREE new theater medals have been authorized for officers and men who see service outside the continental limits of the United States. They are the American, the European-African and the Asiatic-Pacific theater medals. The actual medals will not be made up until after the war but the ribbons are expected to be made available within the next few weeks.

RESPONSE to the first issue of AIR FORCE was gratifying. The value of your service journal can be enhanced in the future by your suggestions and the material you send in for publication. We appreciate the comments and correspondence already received. How about some more? Which features of the December issue did you like best—and why? Which features of this issue? Tell us the kind of articles you want and we will try to get them.—THE EDITOR.

OUR AIR FORCE

After One Year At War

By Lieut. General Henry H. Arnold

COMMANDING GENERAL, ARMY AIR FORCES

The Commanding General reports on our combat record and looks to the future

The following article contains highlights from a graduation-day address delivered by General Arnold at Randolph Field, Texas, December 13, 1942.

IN ONE YEAR the Army Air Forces has proved in combat what it can do. Hitler had seven years to build his air force. We had one year to fight and to build ours—and we had to do both simultaneously. Hitler didn't think we could do it—other people had their doubts, too—but *we did*.

We are building overwhelming air power—on schedule. Our monthly airplane production is over 4,000. Another great expansion program is under way to *double* that output.

We will need those extra planes because this is an aerial war in which one or the other of the combatants will be driven from the sky—and it won't be us. This is a grim struggle in which anything goes. There's no umpire to blow the whistle when a Jap or German clips you from behind. The only thing that counts is the score. Did you kill the enemy or did he kill you?

Did we win or did we lose? Well, the record speaks plainly enough.

From February 1, 1942, through December 5, 1942, the Army Air Forces has definitely destroyed 928 enemy planes and probably destroyed 276 in aerial combat. We have lost 130 of our own and 104 are missing. As the result of aerial fighting, the score stands 928 enemy planes knocked out as against 234 of ours.

Hence the ratio of planes lost is about *four* to *one* in our favor. Bear in mind that these figures include *all* our losses as the result of combats but only those enemy planes whose destruction has been verified.

I want you to *improve* that ratio. Get the enemy in your sights and give it to him. It's your life or his. I want you to destroy them six to one, or eight to one, or ten to one before we're through — and I believe you can do it.

After a year of war we have much to be proud of, but we have really just begun to fight. Do not underestimate our foes.

During the past year we have built airfields all over the world, in blistering deserts, in jungle forest, on top of arctic glaciers. We have trained a tremendous number of men. We have developed a world-wide system of air transport. We have dealt heavy blows against the Japanese and Italian fleets. We have carried on successful bombing offensives in all theaters of war.

Best of all, we have built up coordinated operations with our Army and Navy to an extent undreamed of heretofore.

AND as to the future, we have more to look forward to from our aeronautical research than ever before in our history. We have a "secret weapon" or two up our aerial sleeves that will deal paralyzing blows to our enemies. Our fighters and bombers are steadily increasing in range, speed, firepower and bomb loads. Entirely new aerial "battle-wagons" are on the way. We'll put on a special demonstration of them some day for Hitler and Hirohito.

In 1938 we had only 1,800 officers and 20,000 men. Today, one year after Pearl Harbor, I wish to announce for the first time that the Army Air Forces has over a million officers and men.

And we will have over two million officers and men by the end of 1943.

Our industry has also grown up. In 1940 we had in our air frame, engine and accessory plants about 233,000 employed. Today we have over 1,500,000.

The world has never seen a team like today's Army Air Forces before. We all work together, but we are expected to have "first" teams in combat on eight different fronts. That is a job which would slow up Notre Dame even with Knute Rockne at the helm. We have to do it and—with complete cooperation and help from all sides—we are doing it. Who are the members of our fighting teams, what kind of men are they?

They are not just pilots, navigators or bombardiers. They are not just weathermen, armorers or engineers.

On this great fighting team are the workers in the aviation factories—the men and women with the rivet guns.

On this team is the instructor at a flying school who would a thousand times rather knock down Japs, but who follows orders, and sticks on the job.

On this team is the civilian aircraft spotter on his lonely watch.

On this team is the tail gunner in a Flying Fort.

On this team is the aviation mechanic. He's the most important man of all, although you seldom see his name in the headlines.

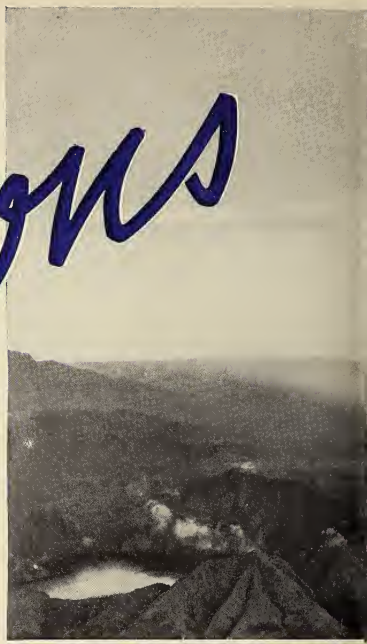
The mechanics are the guardian angels of this whole flying business—they are the hidden air heroes.

Now as to the war itself.

Neither the Germans nor the Japanese have come out of their combats with our Air Force without having to stop for breath —and lick their wounds. The terrific destruction wrought by the Flying Fortresses upon the best fighters that Goering could bring to bear against them came as a distinct surprise. These trained German fighter pilots tried every technique that they could conjure but the results have always been the same.

To date we have had over 1,063 different sorties against the Germans and have lost up to November 30 a total of 32 planes. That total is for losses by both aircraft and anti-aircraft. During those sorties we have definitely destroyed (Continued on Page 35)

AIR FORCES ACTION IN THE Solomons



By Lieut. Hulbert Burroughs

HICKAM FIELD, HAWAII

THE B-17s rolled down the Henderson Field runway early that October morning, on their way to drop a few eggs on a Jap air base at Buka and an enemy shipping concentration at Shortland Harbor. The targets were located at opposite ends of Bougainville Island.

The Zero base at Buka was visited first, and from 12,000 feet the B-17s laid a beautiful pattern of 1,000-pounders right down the middle of the runway. Five Zeros moved in to attack but they were turned back in short order.

The B-17s then turned south to Shortland and found 38 Jap ships, including battleships, cruisers and destroyers, not to mention troop and cargo transports, all gathered together for a nice bombing. The ack-ack was heavy as hell. But from about 11,000 the bombers made their runs and scored direct hits on a cruiser and a transport.

Ten Zeros came up to intercept. Two were shot down. Three B-17s collected a few routine perforations. Another was hit by a 20 mm shell that failed to explode. One of the navigators was killed by a stray 7.7 Zero bullet. A radio operator was hit in the ankle.

The B-17s turned for home. They arrived off shore near Henderson Field just as a flight of 25 Jap bombers was pounding the runway. It was easy to see that the B-17s couldn't land on the pock-marked strip, so they began circling high above the area to await developments. From their grandstand seat the B-17 boys saw quite a show.

U. S. warships near the island filled the sky with heavy anti-aircraft fire. Long condensation streamers curled high in the sky as Marine Grumman fighters dived on the attackers. American landing boats in the process of unloading troop reinforcements cut the water with their white wakes as they chugged rapidly away from their mother ships.

Exploding Jap bombs kicked up huge clouds of dust and smoke on Henderson Field. Finally the bombers were driven off.

The B-17s flew low over the field but the runway had been hit twice. In a moment, however, Marine construction crews swarmed about like ants repairing the strip. Nearby a Navy dive bomber, which had been hit on the ground, sent up clouds of black smoke. Other bomb craters dotted the adjacent area.

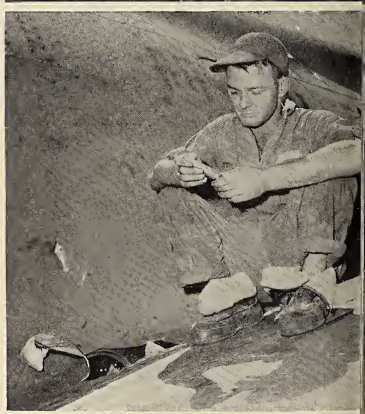
For two hours the B-17s circled. Then, when the Marines had finished their job, the bombers landed. And just in time to get right in the middle of a repeat performance of the show they had witnessed from the air.

Within 15 minutes another wave of Jap twin-engined bombers were spotted heading toward the field. For most of the Air Force fliers, the receiving end of a bombardment was a new position. A similarly new experience was their wild scramble for Marine foxholes.

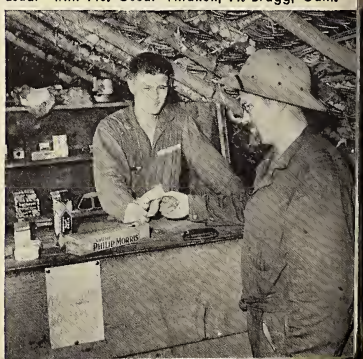
The 20 Jap bombers, flying at 20,000 feet in their usual V formation, dropped their bombs. Three hit the runway, one failing to explode. One B-17 was hit but only slight damage resulted. Most of the other bombs fell wide. Again the indefatigable Marines scrambled onto the runway and, with shovels and crowbars, trucks and rollers, repaired the damage.

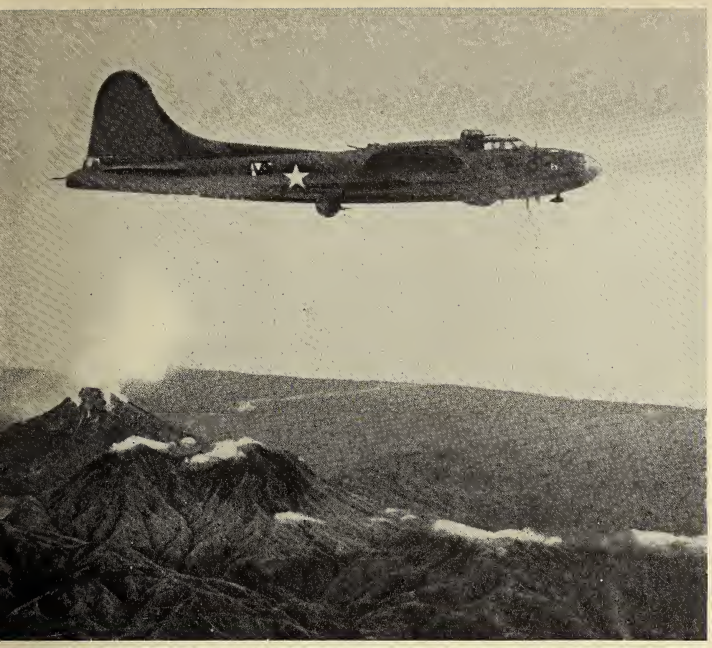
By evening of that day the men were ready for a bite to eat and a night's sleep. But that's a little out of routine for Henderson Field.

At 6:30 p. m. a battery of Jap guns from



Sgt. William E. Rembt, Long Island, N. Y., holds a 20 mm. Jap shell which hit his B-17 but failed to explode during a battle with ten Zeros. Below, Pvt. Rudolph Lander, Farwell, Minn., proprietor of a PX in the South Pacific, conducts "business at usual" with Pfc. Oscar Viitanen, Ft. Bragg, Calif.





AT TOP, a B-17 is shown flying over Jap-held Bougainville Island in the northern Solomons after taking part in a raid on Buka airfield at the north end of Bougainville. Note the active volcano and the crater lake.

ABOVE, these B-17 gunners, back from a flight with the Japs, clean their machine guns at a base somewhere in the South Pacific. At left is T/Sgt. Edward T. Spetch, of Seymour, Conn., and at right is Sgt. Vernon Nelson, of Fergus Falls, Minn.

It's wild fighting and rough living on Guadalcanal for our bomb crews who give the Japs their daily pounding.

the hills to the west began shelling the field. Five-inch projectiles whistled intermittently for an hour and a half. Red tracers from Marine coastal batteries rocketed back into the hills in reply. All was quiet at 9 o'clock and some of the men turned in for the night. They were optimistic.

Two hours later, the Jap land batteries opened up again. At 1:30 in the morning a Jap plane, probably a cruiser catapult type, dropped a flare behind the field and in a few seconds a 16-inch shell from a Jap battleship exploded overhead.

Then for two hours enemy battleships, cruisers and destroyers shelled Henderson Field and Marine emplacements with five, six, eight and sixteen-inch projectiles. Some Air Force personnel sought protection in open foxholes; others crowded into covered dugouts. Throughout the rest of the night many lay on their bellies on the ground behind logs or in bomb craters.

One Jap shell exploded near a dugout in which six Air Force men were lying. The walls caved in and buried five of them. The sixth, Staff Sergeant Sebastian Maraschiello, of Buffalo, N. Y., extricated himself and, during the height of the shelling, managed to rescue three of the others.

At 3:30 a. m. "Maytag Charlie," an enemy plane so dubbed by the Marines because its engines sounded like a washing machine, dropped a flare just short of the runway and then laid two big bombs down the field.

Four more times before dawn enemy planes bombed the runway.

Shortly before sunrise Air Force officers inspected the runway and cleared it of shell and bomb fragments. Miraculously, only two B-17s had been hit, neither damaged badly enough to keep it from flying.

But the runway was damaged, particularly on one end. A conference was held with the B-17 pilots. Could they take the heavy bombers off the shortened runway? They agreed it was worth the try rather than have their ships go through another pasting on the ground. More Jap shells from the hills broke up the conference.

The first B-17 taxied to the end of the runway in the face of the bombardment. The pilot locked his brakes, gunned the motors to full RPM and let her go. The B-17 hurtled down the pitted runway, dodged two craters and leaped into the air just in time to miss three others. A half hour later all the planes were off the ground.

Another day had begun on Guadalcanal.

(Continued on next page)

AIR FORCES ACTION IN THE Solomons

By Lieut. Hulbert Burroughs

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The Japs aren't the only headaches for the men in the Solomons. There is the little matter of weather, for one thing. A "front" in the Solomons is nothing less than a cement wall.

Then on the ground in the daytime there are flies by the millions. Malaria loaded mosquitoes work the night shift and they come in similar numbers. Mosquito bars are an absolute necessity.

There are no luxuries on Guadalcanal. The men sleep in tents on canvas cots with neither pads nor sheets. Officers and enlisted men usually wash their own uniforms. A few have made deals with ex-cannibal Melanesian natives for laundry—provided the fliers supply the soap. There is no hot water, of course. No fresh meat or vegetables, no sweets, no cokes, not much mail from home. And when the mail does come to the South Seas it's usually a month or so old.

TRANSPORTATION, mostly via jeeps and 2½-tonners, is "rugged." When it rains—and the yearly rainfall is about 120 inches, most of which falls during the three month rainy season—the mud is ankle deep. When the mud dries up, the dust is ankle deep. GI shoes have at last come into their own with the Air Force officers.

Despite these hardships and discomforts a tremendous amount of work has been accomplished. One Air Force base in the New Hebrides was hacked out of a dense tropical forest and ready for use in 14 days—thanks largely to that typically American piece of heavy equipment known as the "bull dozer." On one occasion, before adequate servicing equipment was available, one crew, anxious to get into combat, filled the big gas tanks by "bucket brigade," passing five gallon "drinks" from the ground to wing.

Out in the jungle bases there is little distinction of rank either among officers or between officers and enlisted men. There is little saluting. A man is taken for what he is really worth. Between officers and enlisted men there is a feeling of mutual respect and great confidence. This is especially true in combat crews, where morale is very high.

Variety is not lacking in the missions which the B-17 crews fly day after day. Lieutenant Thomas H. Trent, of Hardinsburg, Kentucky, and his crew were out over Kapingamarangi Island (Greenwich Island) near the Carolines, when they spotted a big Jap radio schooner standing off the reef. Having no bombs and despite heavy machine-gun fire Trent dove in for an attack. For 25 minutes his gunners strafed the enemy vessel from as low as 50 feet. By the time the crew had finished its job the schooner was burning and had been beached.

Another of Trent's "routine" experiences occurred on the afternoon of October 15 when he flew to Guadalcanal with other B-17s to bomb a Jap invasion force consisting of cruisers, destroyers and transports. While making his bombing run from 11,000 feet on a troopship, four Zeros made a concerted attack upon Trent's plane.

In the first blast of fire he had his right aileron cable severed by a Jap bullet—that one-in-a-million shot. Out of control, the plane fell 3,000 feet before Trent was able to right it. Again the four Zeros came in, this time to finish off the crippled B-17. Trent's gunners shot down two of the Japs and drove the others off.

Free at last of Jap fighters, Trent faced the almost hopeless task of trying to save his crippled plane. For five long hours he alternately nursed and cursed the faltering bomber. In one stretch of rough weather the plane began to lose altitude. Trent warned his men to prepare to bail out. But again he succeeded in gaining control.

Finally they sighted their home field and were ready to try a landing. In a wide skidding turn Trent made the run for the field, found his right wing dropping too low. It refused to come up even with full left stick. Trent gunned number four engine, brought the wing up and made a perfect landing.

ON THE same flight with Trent was Lieutenant William S. Cope, Salem, Ohio, piloting another B-17. As Cope was making his bombing run on a Jap transport the anti-aircraft bursts grew thicker. Fifteen Zeros waited overhead for our bombers to clear through the ack-ack.

Cope wanted no slip-ups. Over the interphone he called to his bombardier: "Be ready to get bombs away."

In the excitement of the attack the bombardier caught only the words "bombs away." Thinking that something had gone wrong and that it was an order to dump the load, he hastily jettisoned all the bombs. A few moments later two of the cast-off bombs, falling short of the Jap transport for which they had been intended, landed squarely on the deck of a Jap heavy cruiser. Badly damaged, the ship was later sunk by Navy dive bombers.

Captain Vincent M. Crane, Manchester, Massachusetts, and his crew, spent an interesting twenty minutes over Jap-held Rekata Bay one afternoon. From a height of only 200 feet they strafed ground installations, sank two anchored sea-planes, poured 700 rounds of fire into a couple of hundred Japs scrambling around the beach, got hit by a 37 mm. shell which severed one of the control cables in the tail of their ship. By skillful maneuvering Crane made a successful forced landing at Henderson Field, tied the damaged cables together with bailing wire and made it back to his home field.

RETURNING from a tough bombing mission of Jap installations in the northern Solomons, three B-17s ran into one of those cement wall fronts. For hours they sought an opening. Lost and out of gas, they were forced down at sea. Lieutenant James Van Haur and his crew spent seven days at sea on a damaged raft. One man died at sea.

In another plane, Lieutenant Colonel Philo O. Rasmusen, Salt Lake City, Utah, was knocked unconscious by the force of the water-landing. As the ship was submerging, the co-pilot, Lieutenant Clyde Shields, of Aberdeen, South Dakota, himself suffering from a deep head wound, dragged the unconscious Rasmusen through the escape hatch and swam with him to the raft. The pilot of the third plane, Lieutenant Willard G. Woodbury, Omaha, Nebraska, and his crew were luckier. Uninjured, they reached shore in a few hours.

Lieutenant Sam B. White and his crew will have something to tell their grandchildren—if and when. On a mission over Jap territory they were jumped by fifteen Zeros. In a wild fight that lasted about twenty minutes, White's plane was badly shot up. Three hundred and fifty bullet holes riddled the ship, but the crew escaped with no injuries. Lieutenant Everett S. Turner of Binghamton, New York, was struck on the sole of his shoe by a 20 mm. shell. "It was a GI shoe," said Turner. "The bullet suffered more than I did."

On another occasion White and his men were out on a search mission. At 8,000 feet they flew into what White described as "an awfully pretty white cloud." A terrific downdraft hit the bomber and turned it upside down. Crew members rattled around in the fuselage like peas in a pod. The controls went limp. White shoved the stick forward, throttled the motors down. For terrifying seconds the plane careened wildly downward. When it finally broke out of the cloud it was in a vertical dive.

"She was indicating 340 miles an hour straight down and with the motors idling," White reported later. "We were at 2,800 feet before I could get the nose up."

The main spark-plug for such "routine" operations was tough, but affable Colonel L. G. "Blondy" Saunders, one of West Point's former all-time star football players and coach. Working long hours with quiet determination, he still found time beyond his regular duties to accompany his boys on dangerous bombing missions.

It was the Colonel and his boys who had the hectic 24 hours operating out of Henderson Field that early October morning. ☆

"PHYLLIS HAD THE STUFF..."

A pilot's own combat report of extended action against interceptors on a daylight sortie over Occupied France

By Lieut. Charles W. Paine

AT 5 A. M. on October 3, 1942, I was awakened at a Mission hut in one of our bomber stations in England. It was dark, and for a moment I didn't know quite where I was. The hut was so small that I could reach out on either side of me and touch the other officers in their beds. I wondered what I was doing awake at that hour. Then I remembered that the day before I had been assigned as pilot of a B-17 on a bombing operation over Occupied France. At the moment I didn't know the exact location of the objective, but I had been told that it was a munitions plant that was now making goods of war for the Nazis.

I dressed quickly and gulped down the tea that was brought me. After that I went to the Intelligence Office where they gave me the exact location of the objective. My navigator, Lieutenant Thompson, of St. Louis, and my bombardier, Lieutenant Komarek, of Muskegon, Michigan, were there, and I then met them for the first time. We learned that the objective was the Potez plant at Meulte, in Occupied France.

Very shortly after we got news that the operation wouldn't take off as planned, but we were to stand by. There was a good possibility that we'd get "on with it"—as the R.A.F. says—before the day was out.

We stalled around until about noon, while I got acquainted with my crew. I had never met any of them before. They had worked together, but I was a stranger to them. We were polite about the whole thing, but we wanted to know more about each other. As C. O. of a B-17 that was going to take off on an operation over enemy territory, I wanted to know more about them. They'd flown together as a crew and called each other by their first names. A good crew does that. In the air you're all out on the same party. You have to know what each member of a crew will do under any situation of the thousand and one that may come on you without warning.

But I didn't know them, so I went through the motions of inspecting the ship. I discovered her name was Phyllis. It was because of a picture on her front end. It was a picture of a swell girl, but no one in the crew could quite agree as to whose girl it was. The rear gunner, Technical Sergeant Taucher, a coal miner in normal life, said it was because "Phyllis" was *two* of the crew members' girl. That remark caused indignation among the rest, and the thing has never finally been settled. The ship, so far as I could see, was just called Phyllis because she was Phyllis.

PHYLLIS' CREW:

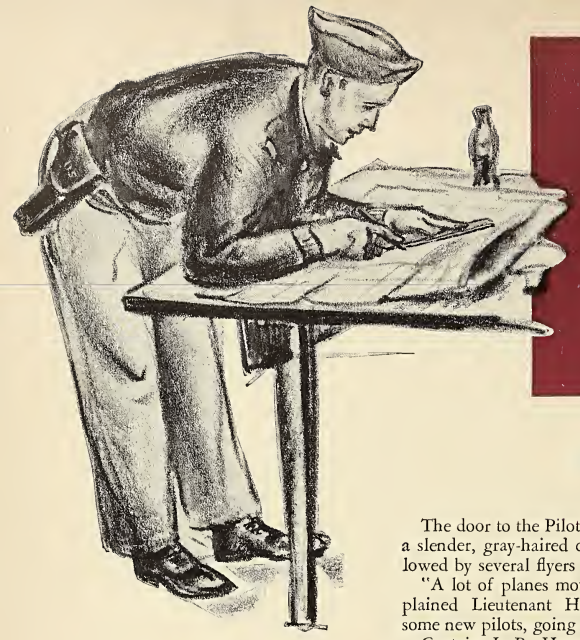
Lieut. Charles W. Paine, Pilot; Lieut. R. H. Long, Co-pilot; Lieut. S. A. Komarek, Bombardier; Lieut. John A. Thompson, navigator; T/Sgt. B. P. Taucher, Rear Gunner; T/Sgt. Ralph Sheeder, Belly Gunner; T/Sgt. A. Bouthellier, Radio Gunner; T/Sgt. Walter Parcells, Radio Operator; Sgt. Thomas Coburn*, Top Gunner, and Sgt. H. Peterson*, Waist Gunner. (*Wounded)

I went through the usual routine of checking the ship and seeing that everything aboard—including the guns—was okay. They were. I've never seen a sweeter functioning aircraft than Phyllis when we took off. She had a good crew, and I hope that I—the pilot and the captain—am in their class.

One thing I found in our favor was that two of the crew—myself and Lieutenant Long, the co-pilot—were lawyers, and that Lieutenant Komarek, the bombardier, was in his last year of law before he got in the Air Forces. Lawyers are often looked down upon, but I can only say that my co-pilot and my bombardier were damn good airmen. The rest of the boys did okay, too, in spite of being commercial artists, truck drivers, statisticians, and other assorted trades.

In the middle of the afternoon, the signal for our take-off came. As is usual at these moments, I was so scared I could hardly walk. Somehow, though, I managed to make it.

Phyllis was a long way from her home in Seattle, but she was magnificent. That was what our ground crew did for us. The guys who'd like to fly, but who take out their yearning by seeing that everything is right before the take off. *(Continued on Page 27)*



NORTH from Great Falls

By Capt. Charles D. Frazer

"THERE'S just one thing to remember on the Alaska run. That is—respect the weather. Sometimes, down in Texas, for example, you can bluff the weather and get away with it. Do that here and you're a gone goose."

We were in the Pilots' Room at headquarters of the 7th Ferrying Group, Air Transport Command.

It was mid-morning, the atmosphere was lazy and still. Several flyers, on cots or scattered chairs, were quietly smoking or reading the paper.

From a red Coca-Cola machine near the door would come an occasional thud as a ten o'clock bottle slid out. From the center of the room you could hear the click of pool balls and, from a huddled group at a corner card-table, a low voice murmuring "I'll call". Frequently, there was the chink of a silver dollar. In Great Falls, Montana, paper bills are regarded as effete. "Eastern money", they call it.

"Yep, the weather up north is always as bad as it promises to be," continued Lieutenant Hughes. "And the trouble is, you have to fly by the seat of your pants. Instrument flying is out, most of the time. Too much metal in the mountains. You get all kinds of compass variations, radio static, and I don't know what all."

Lieutenant Stenson smiled wryly and nodded his head in agreement. Both men know the Alaska run well. For months they have been beating their way up and down this tough air trail which is playing so vital a role in the war and which in peace will probably become one of the world's great airlanes.

The door to the Pilots' Room opened and a slender, gray-haired captain came in, followed by several flyers in leather jackets.

"A lot of planes moving out today," explained Lieutenant Hughes. "These are some new pilots, going to be briefed."

Captain J. P. Herron, the S-2 officer, stood at the head of a long table while the flyers seated themselves on either side. We moved our chairs over near the group and listened.

Imagination stirred at the mere names of way-stations as Captain Herron described the route from Great Falls, the true and magnetic courses, and the radio procedure all along the line. As he talked, route manuals, mileage charts, and maps were passed around among the men and carefully scanned.

Numerous unrelated pieces of advice followed.

"Check weather reports constantly. . . . Stay out of all visible precipitation, both clouds and rain. You'll be sure to get ice. . . . Be on your guard for sharp and sudden changes in temperature and winds. They're frequent. . . . Keep in mind that, usually, you can find warm air aloft. . . . When you get there, make a point to talk with the bush pilots and cargo pilots who have been flying the country for years. They can teach you a great deal."

Listening to Captain Herron, talking with men like Lieutenant L. L. Hughes, a Florida-born service pilot who has flown in many parts of the world and who was a primary instructor in the Army for a year, and Lieutenant W. A. Stenson, a Barksdale graduate who was with a tactical unit before being assigned to the Air Transport Command, you soon understand that ferrying planes to Alaska is no high tea. It's a tough grind, week in and week out. The weather is frequently unbelievable. And it gets cold—so cold that engines have to be warmed up with special heaters.

ILLUSTRATED BY
CAPT. RAYMOND CREEKMORE

But you understand, also, that most of the pilots like the trip. The Inland Route covers new, rugged country and every mile of it is an interesting challenge to the airman.

Traffic is guided and gauged at Great Falls by the "Northern" board, a raw wood affair with row upon row of brass hooks; the board covers a good-sized wall in the operations office.

There are four vertical divisions of the board, the headings of which read: PURSUIT, 2-ENGINE, 4-ENGINE, CARGO. Each division has five columns, with subheads reading: DEPART TODAY, ENROUTE, DELIVERED, PILOT RETURN, PILOT AVAILABLE.

A typed card is made out for every plane to be ferried. This card describes the ship, gives its number, tells where it departed from, what the destination is, the name of the officer assigned to it, and the time of departure. There are spaces for notes regarding any service or repairs the plane may need.

Ferrying pilots or crews have to send in reports every night, in code. It is a rule of the Operations Chief, Captain O. O. Schurter, that each ship's location and condition must be transmitted; he or some other officer always remains on duty until such data is known.

As a flight progresses, the plane's card moves from column to column with all information relayed back to headquarters marked upon it. Thus, a quick glance will not only tell the particulars about any one ship but will also give a picture of the route as a whole.

This is important, for one of headquarters' principal concerns is to keep traffic flowing smoothly. Too many planes at any one station can be serious. Storage facilities are limited and, if weather closes in somewhere along the line, a depletion of gaso-

line, food, and supplies at one point may clog the entire route.

Great Falls' facilities have been expanded and expanded again to fill the needs of the 7th Ferrying Group.

Gore Field itself, until a few months ago, was the city's municipal airport. It is situated three miles southwest of town on a tableland, or bench, as plateaus are called in Montana, about 500 feet high.

This bench has been given over completely to the building of an Army Air Forces base.

There are four asphalt runways. There are a few hangars, but these are chiefly working facilities, rather than storage, for part of the process of winterizing planes is accomplished by parking them in the open, where they are exposed to the snow and wind and cold that will be found to the north.

For some time, the 7th Group had its offices in the Civic Center of Great Falls. Officers lived in nearby hotels; enlisted men were encamped on the Center's indoor skating rink, with their cots ranged in the tiers of the spectator gallery. A banquet room served as kitchen and mess hall.

But now everything has moved up on the bench—to Tarpaper City. Barracks, BOQs,

Ferrying planes to Alaska from this windy Montana "bench" is a grind—and an old-fashioned challenge to the airman.

executive and operations offices, parachute room, communications and cryptographic rooms and other facilities are all of "tarpaper palace" construction, lined with insulation board and heated with stoves reminiscent of a mining camp.

From the control tower of Gore Field, 3,460 feet above sea level, the whole panorama of the ferrying operations spreads before you.

Dispersed around the hangars and on the apron are Army airplanes of every description. B-17s and 25s. A-20s. P-40s and 38s. Numerous cargo planes. Every ship has chalk marks on its olive-drab skin. FULL SERVICE—O. K. GUNS CLEANED AND LOADED—O. K.

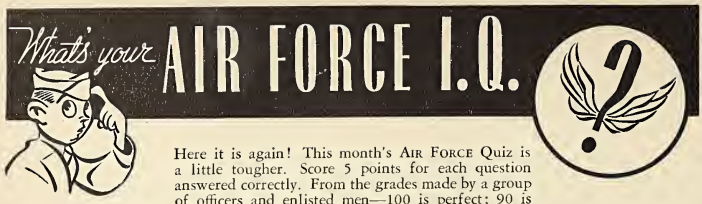
In the shops and hangars are scores of civilian workers, many of them women. Driving around in trucks and jeeps, standing on step-ladders and bending over engines, are enlisted men in coveralls. Standing about in groups, just waiting or keeping an eye on work, are the pilots. They are wearing fur-lined caps and flying suits and close by them are parachutes with built-in arctic kits.

These kits, if needed, will be handily complete. Each one contains a frying pan, compass, trout flies and line, little white pills with which to start fires, iodine to purify water, field rations, mosquito netting and fly oil, bouillon cubes, matches, pistol ball, gloves, and a sturdy knife. Every flyer wears a pistol at all times during a flight.

This happens to be a clear day, without a cloud visible in the blue dome of Montana sky. There's little rain here, in any season. From the control tower you can see for miles over bald, treeless hills and plains to the purple Rockies in the distance. The sides of the bench drop away sheerly to the surrounding valleys through which runs the upper Missouri River, tumbling down Black Eagle Falls and Volta Falls, discovered by Lewis and Clark in 1805. Some miles off is a well-known landmark—the 510-foot smokestack of Anaconda Copper's great smelter.

From time to time new airplanes from the south approach the field and the CAA man is busy at the *(Continued on next page)*

"Check weather reports constantly . . . Stay out of visible precipitation; you'll get ice . . . When you get there, talk with the bush pilots."



Here it is again! This month's AIR FORCE Quiz is a little tougher. Score 5 points for each question answered correctly. From the grades made by a group of officers and enlisted men—100 is perfect; 90 is excellent; 80 is good; 70 is passing; 60 is—well, you can do better! Answers printed on page 40.

1. The empennage of a plane is

a. The nacelle
b. The tail assembly
c. The wing structure
d. The instrument panel

2. A bubble octant is used to measure the

a. Amount of gas in a tank
b. Air speed
c. Oil pressure
d. Angle of elevation of a celestial body

3. A Blenheim bomber is

a. A U. S. plane
b. A German plane
c. A British plane
d. An Italian plane

4. The first successful powered flight by the Wright brothers took place at Kittyhawk in

a. 1909
b. 1896
c. 1903
d. 1918

5. The term Logistics as used by the military applies to

a. Special logarithm tables used in Quartermaster accounting
b. The art of log rolling
c. The details of moving, quartering and provisioning of troops
d. A logical argument employing military statistics

6. Which of the following words does not belong in this group?

a. Cirrus
b. Status
c. Stratus
d. Cumulus

7. A Pitot Tube is most closely connected with

a. Lubrication
b. Air speed
c. Propeller maintenance
d. Gasoline mixture

8. Kiska is located in

a. Russia
b. The South Pacific
c. The Aleutians
d. The North Atlantic

9. Phosgene has an odor like

a. Pepper
b. Apple blossoms
c. Fly paper
d. New mown hay or freshly cut corn

10. The B-25 is a

a. Low-wing monoplane
b. Mid-wing monoplane
c. High-wing monoplane
d. Biplane

11. For installing sparkplugs, Tech Orders state that the length of the wrench should be

a. 20 inches
b. 36 inches
c. 10 inches or less
d. 18 inches

12. Stewart Field is located

a. In Texas
b. In California
c. Near West Point
d. In Missouri

TRUE OR FALSE?

13. The B-24 has a tricycle landing gear.

a. True
b. False

14. The pilot, bombardier and navigator are the only members of a typical heavy bomber combat crew who are qualified to wear wings.

a. True
b. False

15. A radial engine is a liquid cooled engine.

a. True
b. False

16. The letters BT are the Air Forces designation for Bombardment Tactics.

a. True
b. False

17. When walking with a senior officer, the junior walks on the left; when riding in an automobile, the junior should be on the right.

a. True
b. False

18. Identify this Army Air Forces wing insignia:

19. What country uses this marking on its military planes:

20. Identify the plane below:

GREAT FALLS

(Continued from Page 9)

microphone, giving the flyers landing instructions, reminding them always to have "wheels down and pressure up."

Several fighter planes have been warming up and now they taxi down to the end of the runway. They will, when possible, go north in a flight, with some experienced pilot leading the newer men.

"Army Number —— calling Great Falls tower."

"Great Falls tower," answers the CAA man. "Army Number —— clear to Runway 21." He then gives the code signal for the day, the time, wind direction, velocity, and other data.

One after another the planes speed along the runway. They use nearly all of it, going right to the edge of the bench, for when you fly off this shelf of land you're in the air. They bank to the south, make a wide circle, like homing pigeons deciding on their course, then strike due north.

Now a B-17 is on the runway. It doesn't seem to have enough speed to take off but this is a deception. It's in the air quicker than the fighters.

A pair of B-25s follow shortly after. These ships are probably being flown by Lieutenants Hughes and Stenson; their cards were seen hanging on hooks of the DEPART TODAY column. With them are two sergeant flyers, new men who are taking their first trip as co-pilots.

All these ferrying pilots will be gone about a week, more or less. They will return in empty cargo planes and have a day off when they arrive in Great Falls.

They will no doubt come back with some Paul Bunyan-esque tales. And a good many of these tales will concern bears.

There was the time, for example, back in summer, when a couple of pilots left their clothes on the bank of a pond and went swimming. A bear, after picking the pockets of the uniforms, attacked the men. One pilot got away. The other found himself at close quarters, about to be clawed.

Somewhere he had heard that bear noses are tender. After twenty or more lefts and rights to the muzzle with his fists, he won a judge's decision and drove the animal away.

On several of the flying fields soldiers have to patrol the runways at night in jeeps to keep the bears away; where gasoline is cached in the woods along the route, guard duty is also no joke.

Aside from bear trouble, the pilots will find much to occupy their spare time. Perhaps they will fish or hunt. Perhaps they will find or buy at a bargain some mastodon ivory. Perhaps they will enjoy themselves aboard The Yukon Maid and other river boats of the gold rush days that are still to be seen around Whitehorse.

Whatever else they do, they will come back with information that will be invaluable to all who are engaged in the serious business of getting military aircraft to places where they are sorely needed. ☆

THE OTHER NORTH AFRICAN BATTLE

Prepared by the Directorate of Weather,

Headquarters, AAF

PHOTOS of military operations in North Africa usually show clouds of dust and sand, sweat-drenched and sun-tanned men.

But there is another serious weather hazard—rain. When it rains hard in the desert the rain brings mud and sometimes destructive floods. Operations can generally proceed in heat and dust, but not in rain.

Weather in this area is typical of desert conditions in many parts of the world. Annual and diurnal temperature ranges are great, and, away from the coast, overnight freezes occur. Great air bumpiness is experienced in summer, especially inland.

Generally the weather here may be divided into two periods, the hot dry period from June to September, and the dust- or rain-storm period from September to May. Dryness and temperature increase from west to east and north to south. Spring and fall are the best operational seasons.

Mean summer temperatures range from 66 degrees to 88 degrees on the coast and from 72 degrees to 100 degrees inland. Temperatures over 100 degrees are common. Highest temperatures are frequently recorded in June, although July or August has the highest mean temperatures. Dryness and temperature increase as one proceeds from Tripoli toward Egypt.

In the interior the rapidity of heating causes air currents which make flying rough, particularly at low altitudes. Rapid heating also causes lifting power and much fine sand and dust is carried into the air. Whirling sand may reduce visibility to almost zero and develop sandstorms known as "simooms" in Libya and "haboobs" in Egypt, which sometimes reach the coast.

Rapid heating in the desert air also causes visual distortion. Heat waves emanating from the superheated sand and rock make

Weather is the second enemy confronting airmen in the desert war theater.

perception of ground features from the air a very difficult problem.

Cloudiness is rare during the summer, although cumulus and even some stratus cloud is occasionally encountered along the coast. Cloud cover for low-flying operations is hardly ever found. Early morning fogs occur on as many as 7½ days a month in some places, but they burn off quickly.

Landing on untreated areas or traveling over unpaved roads throws up huge clouds of dust. Keeping mechanical equipment well-lubricated and free from dirt is a difficult problem.

In September, the low pressure areas created by cyclonic storms begin to take a more southerly course, passing through the Mediterranean, inaugurating the long period of rain and dust storms which continues through May. In the summer, these cyclonic storms pass to the north and usually, do not affect weather in the North African area.

Rainy weather begins gradually. Rains are rather infrequent in the fall. In Libya, there are 1 to 3 days rainfall in September, which increases to 4 to 9 days rainfall in November. In Egypt, the rains come later, with only 3 to 4 days in November. Rainfall increases in December and January and then tapers off gradually. Highest rainfall is experienced in Cyrenaica.

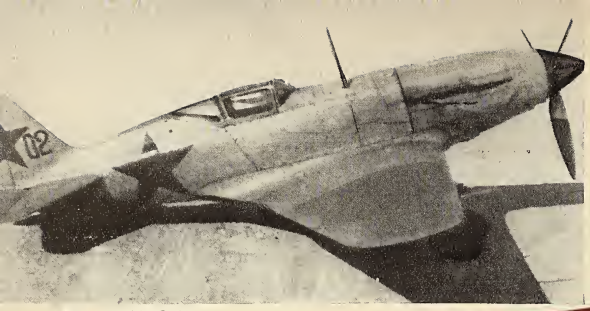
Average cloudiness continues throughout the fall, reaching a maximum of 50 to 60 percent coverage in December, January and February. In Egypt—that is, east of Cyrenaica—the cloud cover is generally between 38 and 40 percent, although Alexandria has a 50 percent coverage in December and January. Mean winter temperatures range between 50 and 70 degrees, with the warmer to the east. Temperatures gradually decrease throughout the fall to winter lows, then gradually increase to summer highs.

Dry dust winds off the desert have their greatest incidence in fall and spring, although any given year may show a wide departure from the average. In Egypt, a dust storm known as the "khamsin" occurs during the period from February to May inclusive, the greatest frequency being in April. The occurrence of such storms is about 12 a year, although they may vary in any one year from 5 to 6 or 16 to 18. In Libya, "ghibli" is the term applied to dry, hot and at times dusty winds originating over the desert.

Dustiness is variable. Sometimes the wind is a continuation of the simoom and then the ghibli is extremely dusty. There is a higher frequency of these winds in Tripolitania than in Cyrenaica. Spring and, particularly, fall are the seasons of most frequent occurrence.

In the west, air operations are least hindered by weather factors in the spring, although fall is also good. Predictable cyclonic activity will bring enough cloud cover to form some protection for aircraft. Good visibility is frequent and usually there is not enough rain to hamper land, sea or air operations. Probable occurrence of the ghibli must be predicted by observing the positions of lows on synoptic charts. Temperatures are not as extreme as in summer.

In the Egyptian area, the season best adapted for air operations is fall. The frequency of good operational weather in the spring is reduced by the high incidence of the khamsin in this season. ☆



Russian MIG-3

German FW190

FOREIGN AIRCRAFT
—Some Technical Aspects

By Lt. Col. J. M. Hayward
CHIEF, FOREIGN DEVELOPMENT PROJECTS, WRIGHT FIELD

COMPARING the relative merits of friendly and enemy aircraft is more than a favorite diversion; it is a serious business to combat airmen and to all who are responsible for assuring that our own aircraft are superior to those of the enemy.

It is not intended here to draw conclusions on the merits of friendly and enemy aircraft but rather to present a few important characteristics of some well known foreign combat airplanes in order to facilitate analyzing the relative technical value of these planes. For it is obvious that the combat effectiveness of an air force is measured not only by good combat personnel but by technical leadership as well.

Early reports on new or unfamiliar foreign aircraft have sometimes greatly minimized their equipment or have attributed extraordinary performance, armament and the like to them. Claims that German and Japanese airplanes were equipped with only a few instruments and were poorly constructed of unsatisfactory substitute materials have not been substantiated by fact. On the other hand, the boasted superiority of speed, high operating altitude and fire power claimed for some enemy aircraft have largely been disproved by experience of our fighting operations or are known to have been obtained at too great sacrifice.

Germany has developed a large number of various types of airplanes, but those which have appeared prominently in reports from the fighting areas include only the Me 109E and F, Ju 87B, Ju 86P, He 177, FW 190 and the Do 217E.

The latest improved version of the Messerschmitt fighter is the Me 109F1 and F2. The design of the Me 109 has been refined to increase its speed to approximately 370 miles per hour and give it a higher service altitude (38,000 feet). In order to accomplish this, low drag radiators have been installed and the armament has been reduced to one cannon (20 mm or 15 mm) firing through the hub of the propeller and two 7.9 mm (30 caliber) guns mounted in the nose of the fuselage on top of the engine. However, the cannon have a high rate of fire: 800 rounds per minute for the 20 mm in the Me 109F1 and 900 rounds per minute for the 15 mm in the Me 109 F2.

Armor plate has improved progressively in the Me 109 series to give optimum protection. The new type of armor arrangement consists of homogeneous armor plate under and back of the pilot, extending well up behind and over his head. Also, an unusual type of deflector bulkhead, comprised of thirty laminations of aluminum alloy sheets, is located back of the seat-shaped fuel tank.

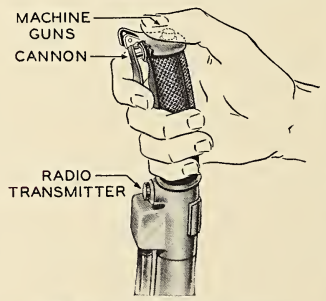


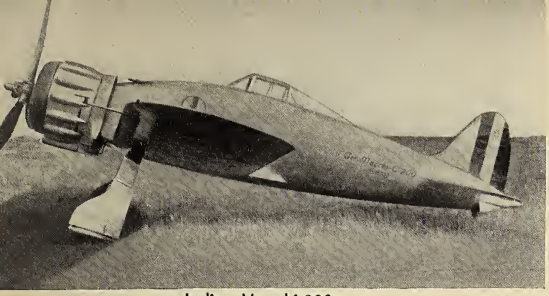
Diagram of a control column handle of Messerschmitt type.

The Junkers Ju 87 (Stuka) obtained distinction early in the war by its use in dive bombing and ground strafing of Allied troops and civilian personnel, particularly during the occupation of the Low Countries and France. This airplane has an ungainly appearance, with its inverted gull wing, projecting dive brakes and fixed landing gear. It is slow and easy prey for a fighter.

THE two-engine Junkers Ju 86 is a medium bomber, the late versions of which have been given a pressurized cabin. It has been seen at 42,000 feet in scattered raids over England but is believed to carry no armament, depending upon altitude for its protection.

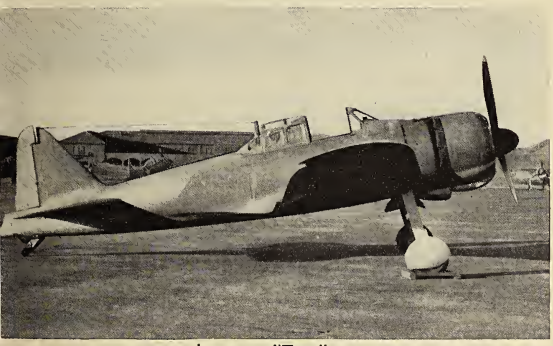
The Heinkel He 177 is the first four-engine German bomber designed for use by the Luftwaffe. Although it is fitted with dive brakes, it has only been reported at high altitudes. The main point of interest in this airplane is its side by side arrangement of two engines in a single nacelle, each set of two engines driving one propeller. It is believed that the airplane can reduce its wing area in flight, permitting higher speeds after take-off.

The latest two-engine medium bomber of the Dornier family is the Do 217E which has special equipment for dive bombing. Many novel features have been included in the Do 217E including the 14 cylinder, double-



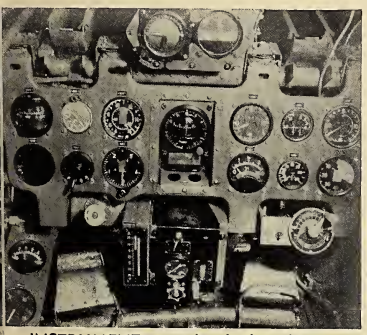
Italian Macchi 200

British "Spitfire"

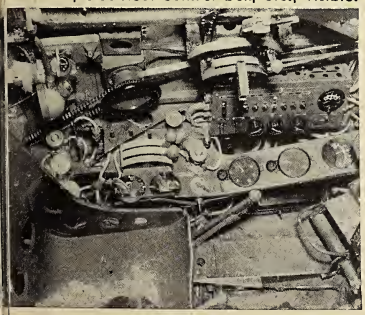


Japanese "Zero"

Our allies and enemies alike are adventuring with aircraft design. Here is a profile of some foreign planes in the news.



INSTRUMENT panel of the Japanese "Zero," showing full complement of gadgets. Below is a view of the left side of the cockpit, with propeller controls, trimming levers, electrical control box, etc., visible.



row, fan-cooled BMW-801 engine, hot air wing de-icing installation and an umbrella-shaped dive brake situated in the tail end of the fuselage.

The first fighter with an air-cooled engine used by the Germans in current operations is the Focke-Wulf FW 190. This aircraft is noteworthy for its compactness and simplicity of design. Reports indicate that it has excellent flying characteristics and that it combines speed, climb, ceiling and maneuverability into a fighter of significant quality. The FW 190, having four 20 mm cannon and two 7.9 mm guns, carries considerably more punch than its famed predecessors of the Messerschmitt series. Like the Do 217E, it has the BMW-801 engine, the main feature of which is a blower fan on the front of the engine revolving approximately two and one-half times the speed of the propeller and forcing cooling air through carefully designed channels around the cylinders. The fan cooling is intended to provide more efficient cooling on the ground, during climb when speed is reduced, and at altitudes where the air is of low density and presents difficulties regardless of the cold temperatures.

Some individual features found on German aircraft are of interest. The handle on the control stick of Messerschmitt planes, for instance, is arranged with a hinged latch that in one position prevents accidental operation of the thumb operated gun button. When flipped over, it uncovers the button and serves as a trigger for the cannon; thus both the cannon and the guns can be operated. A spring holds the latch in the safety position and the cannon button is operated only by the latch which can engage the button. For radio transmission a small switch button is situated convenient to the little finger. On an extension of the throttle handle a pivoted thumb switch permits changing the propeller pitch without removing the hand from the throttle lever.

For a number of years, a heated-wing de-icing system has been incorporated in German bombers. Hot air is obtained from a heat exchanger or muff around the exhaust manifold; the air is conducted through the leading edge of the wing, where it escapes through openings near the ailerons.

Many magnesium castings, some of considerable size, have been used in German airplanes. It has been estimated that a two-engine Ju 86 contained from 500 to 600 pounds of magnesium.

The Germans have placed emphasis on ease of maintenance, particularly on replacement of engines in a minimum of time. A crew unfamiliar with a Messerschmitt airplane completely removed a DB-601 engine in less than twenty minutes.

THESE wily Japanese, as usual, have done a good job of copying the developments of engineers in other countries. However, it is inevitable with such a policy that the original examples are obsolete by the time they are adopted.

The well-known Zero, generally the name given the Mitsubishi "00" fighter, is primarily an interceptor because of a high rate of climb made possible by reductions in weight, resulting (Continued on next page)

FOREIGN AIRCRAFT

(Continued from Page 13)

mainly from the elimination of passive defense measures. It packs a good punch with its two 20 mm cannon and two 7.7 machine guns but the lack of defensive armor plate and leak-proof fuel tanks make the Zero extremely vulnerable. A large internal fuel capacity augmented by an external auxiliary tank totaling 215 gallons give it a long range, estimated at over 1,200 miles.

The carrier-borne Aichi 99 is the standard Japanese dive bomber which has been used extensively in attacks such as the Pearl Harbor engagement. On the under side of the 48-foot wing, dive brakes are set as in the Junkers Ju 87. There is no armor nor leak-proof tanks and the two fixed nose guns and one flexible rear gun are of small caliber (7.7 mm equivalent to our 30 caliber). The fixed machine guns are believed to be adaptations of a German gun; the flexible types are modifications of the obsolete Lewis.

A PLANE closely resembling our Douglas A-24 is the Nakajima 97, which is essentially a torpedo bomber. This plane has been used by the Japanese Navy to carry a 1,700-pound torpedo or two 550-pound bombs. The Mitsubishi 97 (Army), evidently available in large quantities, has been the outstanding Japanese heavy bomber. The bomb load is reputed to be 4,400 pounds and with this load it is believed to have a range of at least 1,200 miles at 190 miles per hour. Four-engine Japanese airplanes reported in operation are mostly the Kawanishi flying boat closely resembling a Sikorsky design; occasionally the German type FW-200; and possibly a model patterned after the DC-4.

Although Italy has produced a fairly large number of airplanes of different types, some of which embody good aeronautical features, there is no indication that the performance of any Italian aircraft is comparable to current models being produced by the leading nations. The Italians show slight progress over the Japanese in equipping their aircraft with armor plate and fuel tank protection. But even in their standard combat airplanes, the Italians seem to have kept their armor to a minimum. The usual gun arrangement in their best front line fighters is two 12.7 mm (50 caliber) machine guns. It has been noted that the majority of Italian fighters are equipped to carry a quantity of light bombs (i. e. 144 two-pound bombs on the Macchi 200) which are dropped and set to explode in front of enemy bombers.

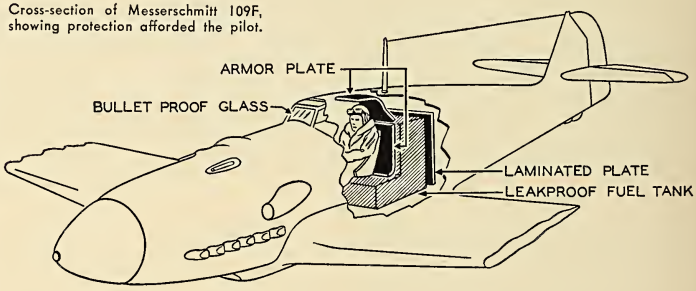
The Macchi 200, originally having a Fiat 840 horsepower 14-cylinder, air-cooled engine, is a fighter which has been in considerable action. The radial engine is being replaced by a German DB-601 liquid-cooled in-line engine which gives it a high speed (in the neighborhood of 325 miles per hour) and an initial climbing rate of 3,000 feet per minute.

Italy's outstanding long-range bomber is the Savoia-Marchetti SM 79. This tri-motor, four-place monoplane has an estimated high speed of 295 miles per hour at 16,400 feet and is capable of carrying a maximum load of 4,400 pounds of bombs or torpedoes. Power is supplied by three 1,000 horsepower Piaggio 14-cylinder air-cooled engines. The Italians have been known to design some excellent engines and airplanes but shortages of materials and the strain of war conditions obviously have seriously curtailed their production of airplanes and interfered with any aeronautical development program.

PERFORMANCE data on Russia's combat type airplanes is seldom officially disclosed. The Stormovik IL-2 fighter has been used extensively in attacks against tanks. It mounts two large caliber cannon as well as two 7.6 mm machine guns. This armament is complemented by rocket projectiles which have been found especially effective against tanks and ground installations. Pilot and engine are protected with an abundance of armor plate.

The German engine BMW-801, used in the Focke-Wulf FW-190 and the Dornier Do-217, has a fan on the propeller hub which forces cooling air through carefully designed channels around the cylinders.

Cross-section of Messerschmitt 109F, showing protection afforded the pilot.



The DB-3F is Russia's best medium bomber; it possesses excellent handling characteristics, has a high speed of 270 miles per hour and good armor protection. The light bomber PE-2 has a very trim appearance with two in-line engines and a well-streamlined fuselage. Other Russian airplanes include the RATA I-16 fighter—short and stubby with a radial engine; the MIG-3 fighter, with a top speed reputed to be 390 miles per hour; the LAGG-3 fighter with an in-line engine and smooth lines broken only underneath by two well-faired scoops; the two-engine YAK-4 attack bomber; and the four-engine TB-7 heavy bomber with two inboard engines carrying the cooling systems for the outboard engines in large underslung nacelles which also house the landing gear and provide a limited space for rear gun positions.

British historians will record for all time the part which the Hurricanes and Spitfires played in the Battle of Britain. While the Hurricane is fading out of the picture somewhat, new model Spitfires are maintaining their reputation as the outstanding British fighter. The latest Spitfire design, with a Rolls-Royce Merlin XLV 1,210 horsepower power plant, attains a high speed of 375 miles per hour at 20,000 feet.

The Bristol "Beaufighter" is a fast, two-engine night fighter, interceptor or attack plane. Its range, 1,500 miles, and a maximum speed of 330 miles per hour, has made it suitable for long range patrol by the Coastal Command. It can reach a service ceiling of 33,000 feet; its armament includes four 20 mm nose cannon and six .303 fixed wing guns.

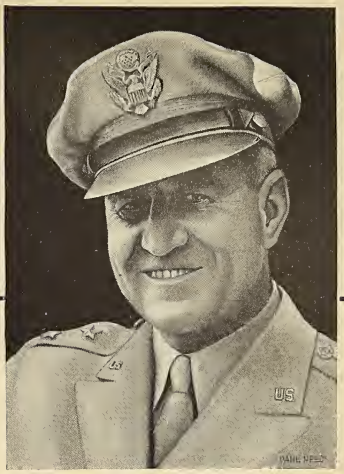
Bombers have been developed considerably by the British. In the two-engine class the Wellington and the Blenheim are prominent. For long range and heavy bombardment the English take pride in their four-engine airplanes, the Stirling, Halifax and Lancaster. The Short Stirling I has taken off with a bomb load of approximately ten tons. The Handley-Page Halifax is not far behind the Stirling in load carrying capacity. In the more efficient Avro Lancaster, a heavy bomb load (12,000 pounds) can be carried 1,200 miles.

All of these four-engine heavy bombers are equipped with .303 machine guns in the turrets, flexible and fixed positions. As the British, until recently, restricted their long range bombing operations to night time, the small caliber guns have been considered adequate protection. The duties of distant sea patrol have been taken by the large four-engine Short Sunderland flying boat.

In friend or foe we can admire the products of engineering skill. ☆

Combat Notes From Down Under

An analysis of Army Air Forces operations in the Southwest Pacific.



By Major General Ralph Royce

Commanding General, Southeast Army Air Forces Training Center

Air Force has asked me to tell you something of the conditions we face in fighting the Japanese in the Southwest Pacific.

The problems are many-fold, and we should face them frankly. Many of the problems have been overcome, for much pioneering has been done, but a lot of hard work lies ahead. The Jap is a ruthless and competent enemy, and nature causes hardships that are almost as bad as the Jap himself.

But I have found that our men of the Air Forces—whether Army, Navy or Marine—do their work uncomplainingly and set up great records in fighting and in maintenance. Our equipment is second to none, and we can match the enemy everywhere in skill and courage—in the air, on the ground and on the sea. We can have implicit faith in our final victory over him.

The key to our operations in the Southwest Pacific theater is, of course, the island continent of Australia. I arrived in Australia shortly before the fall of Java. Ours had been the last American plane to come into Java from India.

Australia is almost as big as the United States, but supports only slightly more than 7,000,000 people, over half of whom live along the east coast in the large cities of Sydney, Brisbane and Adelaide. Most of the industries are grouped around these metropolitan areas, which in turn are largely dependent on the Murray River Valley in the southeastern part of the continent, the main agricultural region.

West of the eastern coast range is a large semi-arid region which the Australians call the "Bush." The country is so dry that the average Australian does not figure on so many sheep to the acre, but rather on how many acres will support one sheep. Beyond the Bush stretches the western desert. When means are found for irrigating this vast arid region, Australia will be able to support a much larger population.

Because of the vastness of the land, combined with its characteristics and the shortage of population, practically no development of highways or railroads has taken place beyond the vicinity of the large cities along the eastern coast range. In the early days each state was developed separately. Jealous of its independence, each built its own railroad—with its separate gauge.

All of this is of vital importance to our operations. The network of independent railroads, for instance, always creates difficulty in the movement of our supplies. If an airplane engine is unloaded at Adelaide in the south, to be shipped 2,500 miles to Townsville in the north, we have to unload and load it several different times.

To move our equipment from Adelaide to Darwin, we have to make the first part of the journey by a slow, narrow-gauge railroad to Alice Springs, almost in the center of the continent, because there is no passable highway to that point from Adelaide. From Alice Springs to the small town of Birdum, some 200 miles south of Darwin, the Australian engineers built a military highway for 600 miles over the desert. Our engineers are now helping to improve this highway. From Birdum to Darwin we trans-ship again on another small-gauge railway.

But even where there is an adequate railroad, the methods of operation and the equipment often are, by our standards, entirely out of date and, in most cases, cannot handle the heavy loads that we have to ship to our various bases. Australian freight cars have been known to break under the weight of one of our Army's prime movers. Moreover, one is unable to turn to the roads, because they are usually impassable except in the extremely dry season. I have known many of our large units to be stuck for as long as a month, although we desperately needed them in the combat zone. Of course, such conditions make air transport vital to our operations. To a great extent we found that it can alleviate many of the transportation problems just mentioned.

Communications, likewise, both for ourselves and the Australians, cause many headaches. Inadequate telegraph and telephone lines were overtaxed even in peace-time. They cannot begin to handle the volume of military business. We turned to the greatly expanded use of radio, but this forced us to encode and decode. Not only did we have to use many additional operatives, but we lost precious time in actual combat operations.

In the matter of airports, Australia is not so bad. Before the war the people had developed a system of airplane ambulances—flown by young doctors who had learned to fly in order to take care of the people who lived hundreds of miles removed from any large center of population. Ranches were equipped with what is known as pedal radio sets, permitting calls for medical aid in the quickest possible time. But the airports used for this purpose, while numerous, were not well situated from a tactical standpoint, nor were they large enough to accommodate our heavy, fast military aircraft.

Moreover, it was found impossible to create large fields as we know them in the United States because of the rocky nature of the terrain, or, in the extreme north, because of dense woods and the lack of heavy bulldozers and earth-moving equipment.

This and a fast-moving tactical picture forced the building of operational strips, 6,000 feet long, 300 feet wide, with the middle hard-surfaced to stand heavy bomber operations. This construction, of course, destroyed the top soil, and then the dust problem became acute. Dust got into every moving part that we used: engines, wheels, machine-guns and trucks. At one island airport the dust was fifty percent pure iron oxide. You can imagine what this did to our engines. *(Continued on Page 40)*

How to Keep Well in the ALASKAN THEATER

Brigadier General David N. W. Grant
THE AIR SURGEON

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

THE following article is the second of a series on health conditions in the various theaters of operation.—THE EDITOR.

THERE are fewer conveniences, more severe winters and greater distances between inhabited areas, but service in Alaska has many similarities to service in the more remote rural sections of the northwestern part of the United States.

Topography and climate account for local variations in living conditions. Winters are coldest in the inland valleys that are surrounded by high mountains; summers are uncomfortable, due both to heat and humidity, especially on the flat tundra of the far north where the sun does not set and the land becomes a vast swamp after the spring thaws.

As far as the individual soldier is concerned, the general problems that influence health in Alaska are for the most part related to hygiene and sanitation, and to obtaining protection from the cold.

When men live in remote areas, they are inclined, especially during cold weather, to become careless with regard to hygiene and sanitation. It is hard to bathe in zero weather; yet experience soon teaches that we will suffer from various skin ailments and become unpopular with our friends if we don't keep clean.

LONG beards should not be worn if the individual will be out-of-doors much of the time. The moisture of the breath accumulates on the whiskers, and freezes, so that there is danger of freezing the skin. If beards are worn they should be clipped short. Shaving should be done before going to bed, for if it is done in the morning, the face will become chapped.

Even in uninhabited districts, strict sanitary discipline will have to be enforced. Sewage deposited on snow in the winter time will be spread over wide areas when the snow melts. It is significant that typhoid fever, a disease not uncommon in all parts of Alaska, is most frequently encountered shortly after the spring thaws begin.

It is always necessary to be certain that water is safe before drinking it. Be sure that the area is absolutely uninhabited upstream before trusting to luck and drinking from a stream. When there is any doubt, drink tea or coffee, or use one of the procedures prescribed in FM 8-40.

Many of the native women (Indian and Eskimo) have venereal diseases, and tuberculosis is quite prevalent among them, so it is best that they be avoided.

THE cold winter climate will influence every act of life from early fall until late spring. Because of the extreme cold, individuals from warmer climates are inclined to disregard the proper ventilation of dwellings. This is very dangerous, for most buildings are heated by means of small wood or coal stoves. Unless there is adequate ventilation, these stoves are apt to produce a very poisonous gas — carbon monoxide. This gas does not have an odor; there is no warning of its presence until the victim is unconscious.

Gasoline engines also produce carbon monoxide, so it is dangerous to operate an airplane motor in a hangar or run an automobile engine in order to keep the heater warm, unless the hangar is well ventilated, or the car is moving. Be sure automobile exhaust pipes are not broken by hitting stumps or snowdrifts, otherwise the gas is liable to penetrate into the car even if it is in motion.

When a closed vehicle becomes stalled in the snow, the engine is generally left running to keep the occupants warm and to avoid difficulty in re-starting. If snow drifts over the exhaust and carbon monoxide fills the vehicle, the occupants may be overcome with gas. Meanwhile, the gasoline may become exhausted. Later, when the vehicle is found, it looks as if the occupants had frozen to death.

In a stalled vehicle always keep the exhaust pipe open by getting out frequently and cleaning away the drifted snow. *Don't go to sleep* in a closed car with the motor running! If you must sleep, open the window enough for a slight draft and rest your head against the glass with your face in the draft. It is possible to insure adequate ventilation without chilling, if windows on the lee side of a building or of a car are opened. Take turns in sleeping.

When traveling, a vehicle should always contain at least two men, and one vehicle should never travel alone. A lantern, a can of coal oil and a blanket will keep you warm and comfortable in a stalled vehicle, even in a blizzard, for several days. Wrap the blanket around you like a tent. Light the lantern and place it between your feet. A blizzard rarely lasts over three days.

Injuries due to the cold will constitute the greatest hazard that the individual will encounter during the winter time. Frostbite is the most common of these injuries. It usually affects the exposed parts of the body, such as the nose, cheek, chin, ears or the feet and hands. Tight clothes and shoes cut off the circulation and thus play an important part in bringing on this condition.

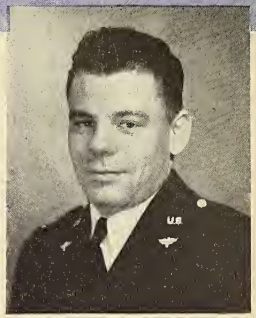
Frostbite most often occurs in cold dry weather where there is a strong wind. It is usually accompanied by a stinging pain, which gives way to numbness, but not infrequently there is only a sensation of cold and the individual does not realize that he has a frostbitten ear or nose. Serious injury may result if the individual does not become aware of it in a short time. He should have a companion inspect him at frequent intervals, looking for the typical gray or white appearance of frostbite. He should wrinkle his own face and wiggle his toes and fingers constantly.

If there is any stiffness of the skin, it should not be rubbed with snow, nor should the affected part be placed near a fire; it should be *(Continued on Page 22)*

ROLL of HONOR

Capt. Francis C. Gideon

Lt. Col. W. B. David, Col. Arthur J. Melanson and Maj. Gen. Robert Olds award the Soldiers Medal to substitute for Staff Sgt. Edgar T. Raezer and Staff Sgts. Verlan M. Davis; Eugene A. Rynerson; Wm. E. Petersen and Rudolph R. Kudlach.



Major John D. Bridges

DISTINGUISHED SERVICE CROSS

LIEUTENANT COLONELS: Francis R. Stevens*, Richard H. Carmichael. **CAPTAIN:** George Lavin, Jr. **LIEUTENANTS:** Jack Donaldson, Lyman Middleditch, Robert M. Wilde*. **MASTER SERGEANT:** William H. Prince.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERALS: Herbert A. Dargue*, Clarence L. Tinker*. **COLONELS:** Charles Bundy*, Oliver S. Ferson*.

SILVER STAR

MAJORS: John D. Bridges, Edwin B. Broadhurst (also Purple Heart), Thomas J. Christian, John E. Dougherty, Thomas H. Hubbard, Kenneth R. Kreps, Oswald W. Lunde, William E. McDonald (also Purple Heart). **CAPTAINS:** Bruce H. Bennett, John Brownewell, John W. Carpenter 3d (also Oak Leaf Cluster), Kenneth Casper (also Oak Leaf Cluster), Henry J. Hawthorne, Maurice Horgan, Ben S. Irvin, John D. Mainwaring, Lewis B. Meng, Alvin J. Mueller (also Purple Heart and Distinguished Flying Cross), Robert Northcutt, George W. Prentice, Michael E. Sims, Allison W. Strauss*, Robert L. Williams. **LIEUTENANTS:** William H. Ambrosius, Stephen W. Andrew, Clyde H. Barnett, Jr., William G. Bennett, Marne Boelke, Theodore E. Burda, Wilson A. Chapman, David M. Conley, Samuel C. Cravens, Robert Debord. **MASTER SERGEANTS:** Roland A. Boone (also Oak Leaf Cluster), William J. P. Griffin, George Heard, Elving Moncrief, James E. Worley (also Oak Leaf Cluster). **STAFF SERGEANTS:** James B. Bunch, Robert Chopping, O. C. Cook, Meredith E. Durham, Orin W. Hawkins, Stanley C. Jackola (also Oak Leaf Cluster), Milton F. Kelm, John H. Lindgren, Douglas H. Logan, Albert L. Malok, Robert R. Noller, Wallace L. Olford, Leroy H. Penworden, Charles S. Savoini, Irvin S. Schier (also Oak Leaf Cluster), Robert W. Schlotte, Lorenzo H. Snow, Derwin D. Terry, Wiley C. Walters (also Purple Heart). **TECHNICAL SERGEANTS:** Walter Kolbus, John G. McKenna (also Oak Leaf Cluster), Arthur L. Richardson (also Purple Heart and Distinguished Flying Cross), Martin M. Schadl, Ralph J. Stiles, Coy H. Thomas, P. M. Vasalie, Clebert L. Washburg, Sam E. Weaver. **SERGEANTS:** Mario J. Filigenzi, Charles D. Franklin, Jr., Casimir J. Slodki, Charles H. Spencer (also Oak Leaf Cluster), Billie B. Sutton (also Purple Heart, Distinguished Flying Cross and Oak Leaf Cluster), George Sweedar, Franklyn L. Timberlake, Regis D. Weinfurther, Lloyd D. Whipp, Joseph O. Wingard, Kirk K. Wyatt. **CORPORALS:** Robert Alderson, Lowell A. Anderson* (also Purple Heart*), Norman A. Carlsen, Julian J. Champagne, W. D. Clarke, Francis M. Fowler, Harold E. Guse, Paul K. Harmon, Clarence M. Hoehn, Gary C. Hollister, Maurice L. Londer, Ralph I. Martin, Leonard M. Secor, Lonnie D. Wright. **PRIVATES FIRST CLASS:** George P. Marasci, Smith W. Radcliff. **PRIVATES:** Robert P. Elmerick, A. G. Osborn, Sydney Schwimmer, Harold Van Dorn, A. C. Wangler.

*Posthumous

PURPLE HEART

BRIGADIER GENERAL: William E. Farthing. **MAJORS:** Richard R. Barden, James V. Edmundson (also Distinguished Flying Cross). **CAPTAINS:** Nathaniel H. Blanton (also Oak Leaf Cluster), Arthur A. Fletcher, Jr., Francis C. Gideon, J. J. Kruzel (also Oak Leaf Cluster to Silver Star), Cuthbert L. Moseley, Jr. (also Oak Leaf Cluster), John Herbert Posten (also Oak Leaf Cluster), Stephen M. Smith, Percy Stoddart, Jr. **LIEUTENANTS:** Frank E. Angier, John R. Giddens, Stanley R. Holland, James A. Kaughtry, Verner E. Peterson, Marston C. Reed, Lyle A. Slocum*, Walter S. Smith, Harold Spire, Phillip Sprawls, William R. Ware (also Air Medal), Donald A. Walter*, Lewis P. Wells*, Lawrence Werner, Charles E. Windus, Anne G. Fox, Nurse Corps, for bravery in action at Hickam Field on December 7. She is the first woman to win this award. **FIRST SERGEANT:** Frank C. Devine. **STAFF SERGEANTS:** Edwin Smith, Anthony Leodora. **TECHNICAL SERGEANTS:** Joseph Markiewicz, Vincent Tooney. **SERGEANTS:** Kenneth A. Gradle (also Distinguished Flying Cross and Oak Leaf Cluster), Russell Huffman (also three Oak Leaf Clusters to Silver Star), Clevis Jones (also Oak Leaf Cluster to Silver Star), Howard Thompson, Riley R. Wilsey*, Robert L. Whitham*, James Wright*. **CORPORALS:** Bert Lee, Jr., Furman C. Martin, Jr., Kenneth E. Nelson (also Air Medal), Edgar L. Rogers*, Peter Wargo. **PRIVATES FIRST CLASS:** Charles J. Correll, Morris Moskowitz. **PRIVATES:** Blake C. Allshouse, Howard J. Beatty, Edwin T. Bottelson*, Gordon W. Boutellier, Norman M. Boutin, Joseph R. Drisner, Wildred Hellenbrand*, Richard G. McClung, Ben Odette, William Osborne, Walter H. Rockman, Newbra Ross, John H. Schwister, Walter Smith, Garrett C. Tyla. **AVIATION-STUDENT:** G. A. Plaster. **TECHNICIAN:** George L. Finkelstein.

DISTINGUISHED FLYING CROSS

LIEUTENANT GENERAL: George H. Brett. **MAJOR GENERAL:** Lewis Brereton. **LIEUTENANTS:** Edward Crouchley, William Joyner, James H. Mitchell*, Albert Thom, Manford K. Wagnon, Thomas N. Warren, Herbert C. White, Jr., McLyle G. Zumwalt. **SERGEANT:** Leslie Cain. **CORPORAL:** F. Ottauiano.

SOLDIER'S MEDAL

STAFF SERGEANTS: Verlan M. Davis, Rudolph R. Kudlack, William E. Petersen, Edgar T. Raezer, Jr., Eugene A. Rynerson. **SERGEANT:** Earnest L. Kilgore. **CORPORALS:** George Barnes, Bruce G. Benson, James M. Gilbreath. **PRIVATE FIRST CLASS:** John S. Stratton.

(Continued on Page 40)

Sgt. Kenneth A. Gradle

Lt. Herbert C. White, Jr.

Lt. Richard S. Smith

Capt. Felix M. Hardison

Lt. Col. R. H. Carmichael

Sgt. Herbert E. Baisch

THE BAMBOO FLEET

By Captain Roland Barnick

Gowen Field, Idaho

THEY called me The Admiral of the Bamboo Fleet.

That's because I flew a resurrected Navy amphibian between Bataan and Mindanao during the closing days of the Philippines battle.

The amphibian had a nickname, too. We called her The Duck.

There were eight of us in the Bamboo Fleet—Captains Jack Caldwell, Joe Moore, Jack Randolph, Bill Bradford, Harvey Whitfield and Dick Fellows, Sergeant Bill Strathern, and myself.

We were all Army Air Forces pilots who had come over with P-26s or P-40s long before Pearl Harbor. Four of us were serving our third year in the Philippines and all of us had been there at least eighteen months when war broke out.

Our P-40s, after the Jap attack, were all busy in combat but they didn't last too long. Some were shot down, some were riddled on the ground, some cracked up in operation.

But we still needed men and planes to maintain air transport communication between the islands of the Philippines.

That's where the Bamboo Fleet came in. It was organized in February, 1942, by the late Brigadier General Harold H. George to fly personnel out of Bataan and Corregidor, and to bring in food, quinine, and other supplies from Mindanao for the wounded among General MacArthur's ground forces.

Of over four planes, three were patched-up civilian ships that had never been meant for war-zone flying. The other was The Duck, a three-place Navy Grumman amphibian that had 700 horsepower and could do ninety miles an hour when the wind was right. The Duck was my plane and that's how I got dubbed The Admiral.

We found The Duck in Meriveles Bay at the foot of Bataan, across from Corregidor. She had been sunk there by Jap strafing about three months before the fall of Bataan.

When we decided to lift her out she was awash clear up to the propeller hub and had been that way for six weeks. But we finally got her up. We did it by means of a barge with a crane on it, a little ingenuity, and a lot of hard work. Dripping wet, the Duck didn't look too flyable.

The other three planes were commandeered by the U. S. government from civilians, natives of the Philippines.

One was a three-place Waco of ancient vintage with about 250 horsepower when it was feeling right and could have made ninety miles an hour if it had been new.

Another was a three-place Bellanca of about the same power and speed—so old and shaky that it had been condemned for private flying when we got it.

The other plane was our "speedster." It was a four-place Beechcraft that turned out 450 horsepower and could do about 170 miles an hour, if pushed.

That was the Bamboo Fleet. And it was appropriately named. The planes were all patched together with native bamboo and what other odds and ends we could find. Where there were no airplane tires around, we used truck tires. On one ship a caster from a wheelbarrow was used as a tail wheel. There wasn't a gun in the fleet.

The Duck was particularly lame. After we dug her out of the bay, we tied her wings on with baling wire, patched the fuselage with native wood, and fixed up the power plant with parts taken from other engines of different type and with miscellaneous parts from various aircraft.

I guess The Duck was held together mostly by faith. Repair of the Fleet, of course, was quite a problem. There were no spare parts to be had and there were few mechanics available. All pilots pitched in on service and repair work, and somehow we got by.

All of our flying was over enemy-held country or water. We would hop off from Bataan or Corregidor fields, fly to Cebu about 300 miles to the south, refuel at hidden bases there and then fly on to Mindanao —a total of 550 miles.

The planes were built to carry from 250 to 600 pounds pay load. We carried from 500 to 1,400 on every trip, with extra passengers going out, extra freight coming in.

We made about 35 round trips in all, evacuating 100 to 120 personnel and bringing in tons of supplies.

The little planes of the Bamboo Fleet finally went down fighting.

The Waco got hers between Cebu and Del Monte in Mindanao. She had taken off from Cebu with three of our men aboard. But she didn't quite get away. Two Jap Navy patrol planes caught her in the air and literally burned her right out of the sky. The crew went with her.

Just about that time the Beechcraft got caught by the Japs in the air over Mindanao, had its landing gear wrecked, and made a crash landing. A Jap plane came in and shot it up on the ground.

The Bellanca was lost trying to get away from Corregidor. She had landed there somehow at night and had been hidden in a cove during the day; the next night she tried to take off down a sloping, unlighted runway that was badly pockmarked with

shell craters. The Bellanca got off the ground all right but she was too old and too overloaded. She crashed in the bay just a few hundred yards off shore.

That left The Duck. The Duck and I were still on Bataan at midnight on April 8, the last night before the peninsula capitulated.

On April 9, at 12:30 A.M., five passengers and myself crowded into the two-seated amphibian. We took off while the area was under heavy Jap artillery and machine-gun fire, and got away only fifteen minutes before the field surrendered.

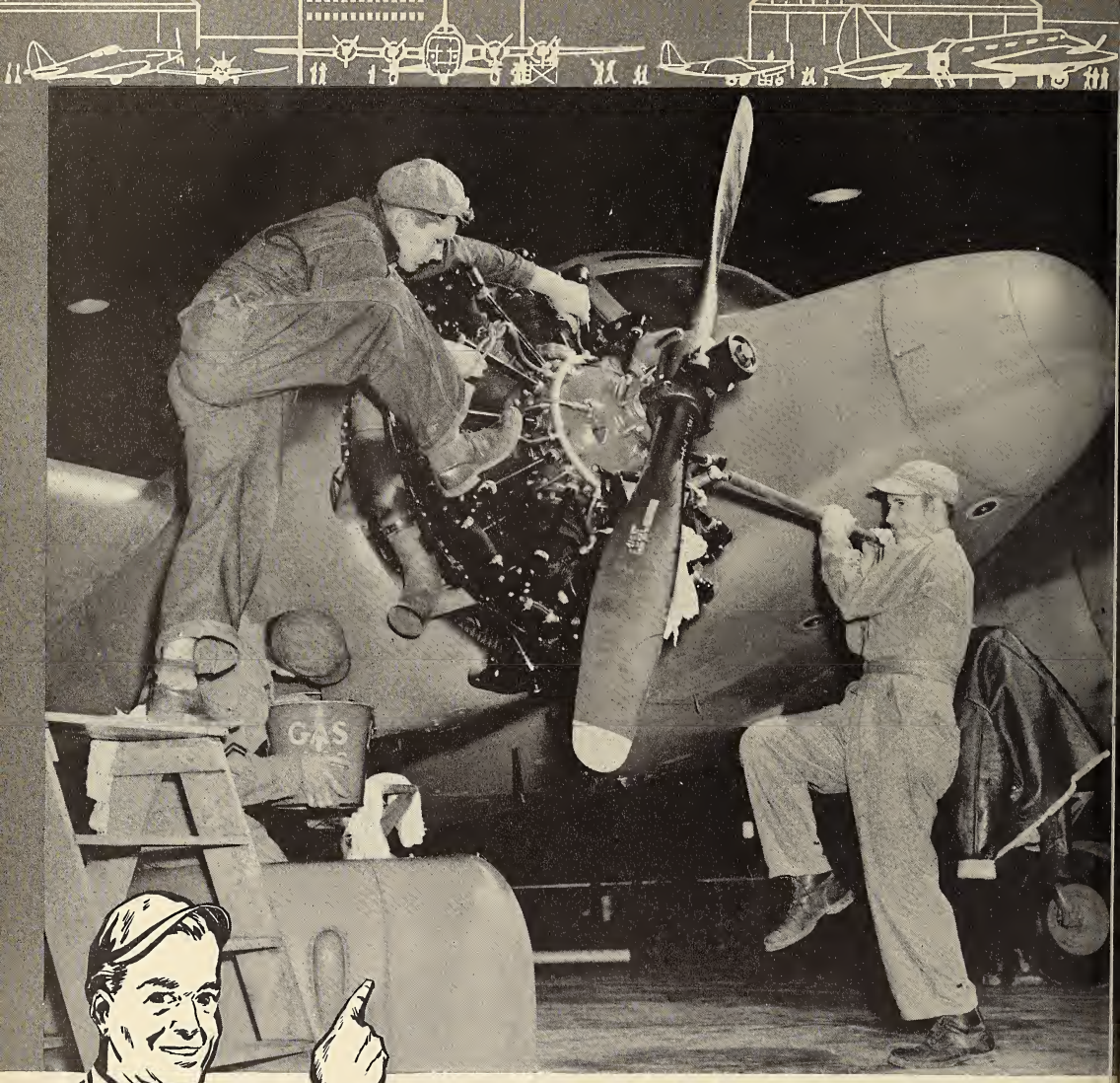
Ours was the last plane to leave Bataan.

When we got in the air I found we were so heavily overloaded that we could only make 75 feet altitude. To help us climb I had the passengers throw out their parachutes, extra clothing and baggage, together with the floorboards from the plane's hull and everything else whe could strip out.

That gave us another fifty feet.

With no instruments, very little fuel, and a prayer, we headed in the general direction of Cebu. We made Iloilo. The next day we ripped some more stuff off The Duck and adjusted the propeller. That night we took off for Mindanao. We made it, too, and that's where I left The Duck, on April 25. Shortly after I was off for Australia.

I left The Duck intact. There were a few other pilots around who might have flown her after that. I wonder if they did.



What's Wrong With This Picture?

PLENTY! It's so full of maintenance and safety boners that you should pick out the mistakes in "nothing flat". Are they obvious? Definitely. Funny? Definitely not. These boners—and others like them—are pulled every day by men who know better but just don't think, or who fail to read and follow TECH ORDERS and SERVICE MANUALS.

Naturally, in extreme emergencies and often on foreign combat fronts you'll have to improvise and use the ingenuity that makes AAF mechs tops in their work. But, as long as you can, it pays to use the right tools for the job—and it pays to *use your head.*

The mistakes in the picture are listed on the opposite page. Did you catch them all? Did we?

On the Line

A monthly roundup and exchange of hints and tips for mechs—some old, some new—in the interest of better maintenance.

The Open Season on Mekiwis has started. (Mekiwis, of course, are planes grounded because of faulty maintenance). Men in maintenance and technical inspection work all over the country are sending in their suggestions on "Do's and Don'ts" of maintenance; telling us about prevalent boners that create Mekiwis.

The boners pictured at the left are the pet peeves of (left to right) S/Sgt. Harry E. Lyons, Cpl. Leo Pequiqnot and Sgt. Walter E. Wint, all of Headquarters Squadron, Air Service Command, Patterson Field, Ohio, who posed this picture for Air Force.

Send your ideas and suggestions on improving maintenance to the Air Force Editorial Office, 101 Park Avenue, New York, New York. This applies especially to you old timers who have a lot of ideas that make maintenance work easier, quicker and safer. Others need your tips, hints and short cuts for spotting trouble. We'll print as many as we have room for, giving full credit to contributors. (If you insist on staying anonymous, we'll string along.) Your suggestions will help others *get the Mekiwis off the ground.*

A Warrant Officer at a southern air base starts us off with these tips. Who's next?

Tough Nuts And Bolts . . .

Ever experience difficulty in starting nuts and washers on the hold-down studs while installing starters or generators? By using a bit of heavy grease, the flat washer can easily be positioned with the index finger. Or, with an old hacksaw blade and some masking tape which will bind it to the castellated nut, the starting of the nut on the stud threads can be made easier.

Time Saver . . .

Placing a pencil mark on the head of a bolt or stud which requires locking of the nut by a cotter pin or lock wire will save time. The pencil mark on the head of the bolt or stud, if directly in line with the cotter pin-hole, will always enable you to know under which castellation of the nut the pin-hole is hiding.

Safety Notes . . .

When removing a carburetor, protect the rest of the engine by placing over the opening a piece of heavy stencil paper cut and punched to fit on the studs.

Always check the control locks before putting a plane to bed. Rudder banging from one extreme to another can cause failure of a control system in take-off or in flight.

Thanks to Mr. Mike Dietz, Chief Inspector at Patterson Field, Fairfield, Ohio, for the blue prints and tips on every-day maintenance mistakes appearing at the right.

Mistakes On Opposite Page

Reading from Left to Right:

1. Look out there, Herkimer—you'll fall off that ladder. It's certainly too far from the engine for convenience or safety. (See A.C. Circular 130-2, Sept. 18, 1933.) What's more, you should be using the correct crew chief maintenance stand.

2. Sabotage! Get your foot off the rocker box and interconnecting lubricating lines. Reference: Common sense.

3. That spark plug high-tension lead wasn't made to hang on. You'll pull it loose. Reference: Common sense.

4. Good Lord, is that a pair of pliers you're using on the "hex" nut of the spark plug elbow? You'd better read T.O. No. 03-5E-1 and use the prescribed elbow wrench.

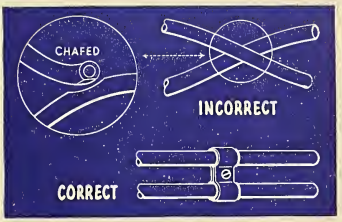
5. Hey, you, under the engine! You're a one man fire hazard draining gasoline in a closed hangar. You should have drained it outside the hangar. Read up on fire prevention in AAF Regulation 85-6. Incidentally, T.O. No. 01-1-1 requires all volatile fluids used for cleaning to be stored in and used from safety-type containers.

6. That cowling definitely should *NOT* be under the engine . . . and you'd better not let the crew chief catch you sitting on it.

7. Hey, stop it, you on the right. You'll freeze that spark plug so tight we'll never get it out. *NEVER* use an extension on a wrench to tighten plugs. The wrench shouldn't be over ten inches long. Better use a twelve-point or box wrench and the torque specified in T.O. No. 03-5E-1. And don't forget to put the anti-seize compound on those plugs.

8. Incidentally, that pitot tube wasn't put there for a coat rack. Oh, you're keeping the grit and dirt out? Then you'd better use the pitot tube cover as specified in T.O. No. 05-50-1.

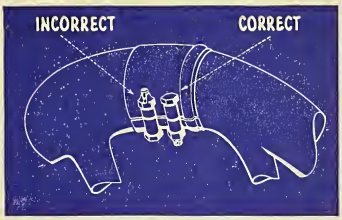
9. And don't forget to take that rag out of the engine. Believe it or not, a Tech Inspector recently found a yard of oily cloth in an intake tube.



COPPER, ALUMINUM TUBING

INCORRECT: Tubing not properly spaced and anchored; results in chafing and, in extreme cases, failure of system.

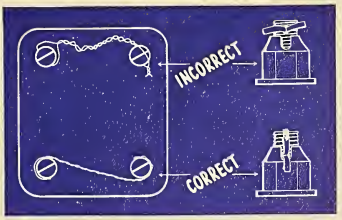
CORRECT: Separate the lines by using clamps or rawhide lacing. (Where a number of lines exist, a fibre block should be used to keep the lines separated and properly anchored.)



EXHAUST BOLTS

INCORRECT: Bolt improperly placed with head in downward position. If nut comes off, bolt works out and is lost; escaping flame causes damage.

CORRECT: Head of bolt placed in top position.



SAFETYING

INCORRECT: Safety wire too loose. Cotter keyhole too high above castellation of nut (When incorrectly safetied, screws will work loose; accessories will move around, shear bolt and cause damage.)

CORRECT: Safetying should be in direction of tightening; wire should be taut. Cotter keyhole should be well down in castellation of nut.

How To Keep Well

(Continued from Page 16)

warmed gradually. If it is the face, place the palm of the hand over the area for a few minutes; if the hand, put it inside the shirt under the armpit; or, if the feet, do like the Russians do, and put it under a companion's shirt. If the warmth does not return and the numbness disappear in a short time, medical treatment is necessary.

In case a doctor is not available, the patient should be taken into a cool room, and the heat of the room gradually increased. If lukewarm water is available, place the frozen limb in it, or, in case of a frostbitten face, make a compress of lukewarm water and apply to the area. All tight clothing should be loosened, and the injured person given warm food and drink. Do not rub the frozen area; but it is advantageous to gently massage the skin about the area in order to stimulate circulation. If the skin becomes black and blisters form, treat them like burns until the patient can be taken to a medical officer.

ANOTHER injury due to the cold that is common in Alaska is trench foot. This is the name given to a condition that results from prolonged standing in cold water or mud, or wearing wet socks and boots. Mild cases are sometimes called chilblains. This condition is most common when the temperature is near freezing (32° F), so that, in Alaska, it usually occurs in the spring or the fall of the year, when there is slush and mud. If care is taken to keep the feet dry, either by wearing waterproof shoes, avoiding mud and water or changing wet socks and shoes at frequent intervals, this condition can be avoided.

The uninitiated should be warned that the skin will stick to cold metal. This is especially important to those that use tools, guns, whistles and the like. The lip, tongue and hands are the most frequently affected parts. The skin freezes when it comes in contact with the metal object, and the only way that it can be released without tearing the skin is to heat the metal. Be careful in this act, otherwise a serious burn or scald may result.

Although Alaska is thought of as a dark, blizzardy country by many people, the sun can account for several painful injuries, even during the winter time. Sunlight reflected from snow, ice or water rapidly produces a sunburn, even in the Arctic. This will not occur during the middle of the winter, since the sun is below the horizon. However, it can occur in spring, summer and fall.

Snow-blindness is another injury due to the sun that can occur when the sun is shining. It usually occurs when there is a slight overcast, and is most common in flat country, especially in areas devoid of any vegetation. It is caused by the reflection of light from snow or ice, and usually begins with a slight blurring of vision. This blurring gradually increases and eventually there is smarting and then severe burning pain. The eyes become red and swollen. Finally, because of the extreme discomfort caused by the glare of the sun, the sufferer must cover his eyes.

This condition is not permanent, but the sufferer is helpless for several days. Once having had snow-blindness, the individual will be more susceptible to further attacks. It can be prevented by wearing pigmented glasses, or, if none are available, by covering the eyes with a scarf and looking through the holes between the yarn. The Eskimo makes goggles of wood or hide with a small slit to look through. Cold compresses of snow, ice, water or strong tea will give some relief but should not be used if there is any danger of freezing. Bandages which exclude all light will have to be worn for several days.

Snow-blindness does not occur among aircraft personnel while flying, but bright Arctic light does produce considerable eyestrain, so dark glasses should be worn always.

It is important to know how to care for and use Arctic clothing, for it is only by constant care and realization of the limitations of the various articles that they will be capable of protecting the wearer from the cold. The basic principle of Arctic clothing is to have a semi-airtight, preferably waterproof, outer garment and several inner wool garments. Wool absorbs perspiration, and since even during the coldest weather exertion is accompanied by sweating, it is necessary to have clothing that absorbs moisture. The outer garments should either be opened or removed during exercise to prevent overheating and to allow air to circulate freely and thus remove the vapor of perspiration. Socks and clothing, wet either because of perspiration, immersion or melted snow, should be removed as soon as possible, otherwise the wearer is apt to become chilled.

SNOW should always be brushed off clothing or it will melt and wet the garments, destroying their ability to retain heat. Tight clothing should not be worn. Shoes that are too small, too many socks and use of straps and leggings all cut off the circulation and thus tend to increase the chance of freezing. When shoes get wet they should be dried out by hanging near the ceiling of a heated building or tent with the other damp clothing. If they are placed near a fire, they will lose their oil, crack and become stiff. Sleeping bags should be aired out every day.

Men wounded in battle in the Arctic are very susceptible to frostbite. They are usually perspiring profusely while engaged in combat and when they fall they become chilled. They lose bodily heat rapidly due to shock, blood loss and direct contact with the cold ground. They should be placed in a warm spot as soon as possible, in a sleeping bag if a building is not available. Snow should be brushed off the clothing of the wounded before placing them in sleeping bags, otherwise it will melt and cause further discomfort and chilling. Wounded men should receive hot drinks as soon as possible. ☆

Forced Landing In The Arctic

IN THE Arctic the careful airman always makes sure that all emergency equipment and rations are on the airplane before he takes off, even if he is starting out on just a short hop. He may be forced down within a few minutes flying time of camp, but on the other side of a mountain range or in an uninhabited area from which it may take days of hard walking to get back to the base.

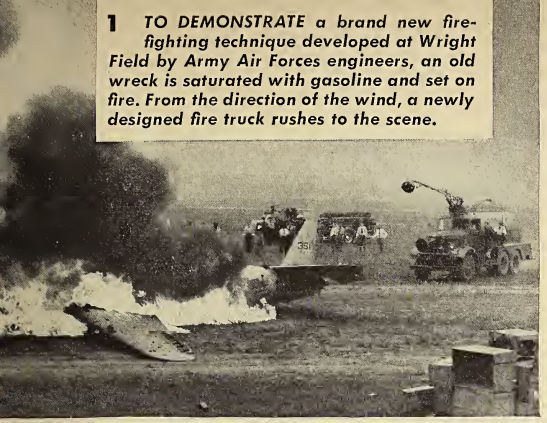
If forced down, stay in the vicinity of the plane until you are sure that the search for you has been called off. Smoke can be seen for great distances in the north; if nothing else is available, pour oil on rags and make a smudge of them. Set out panels of metal or cloth so they can be noticed by an airplane. Lampblack, powdered aluminum or other paints may be carried in the ship to be spread out on snow or water to attract attention. Tracks filled with green branches are also good. Designs should be 200 feet long to be readily visible from the air.

Make a shelter from airplane parts, or a tent from your parachute. An excellent pack-sack can be fastened from your parachute harness and ropes. Snow shoes and sleds can be made from engine cowlings, inspection panels and doors. The inner tubes of the tires may be removed and taken along to use as a raft if a collapsible boat is not among the equipment. All of these tasks will not only keep your mind occupied, but will also keep you moving about and warm, as well as prepare you for any eventuality if you are going to have to make your own way back to camp.

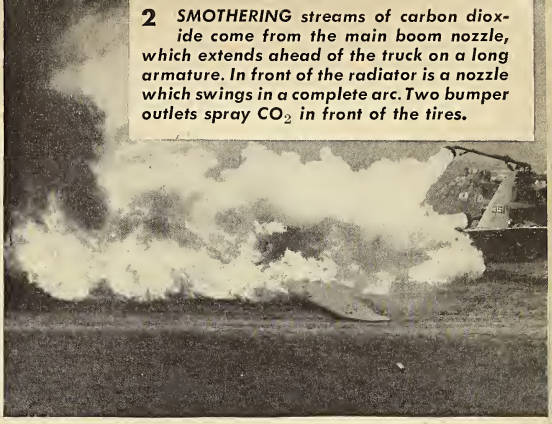
When you are absolutely sure that the search for you has been given up, select the things that you will need and start out on a definite course. The parachute can be used as a tent, windbreak or shawl. So do not discard any flying clothes; you may need extra clothing to replace worn out equipment, or as a change if you get wet. If there are any containers, take along some of the motor oil for use as fuel for cooking or as a lamp. Take along your Very pistol; it may come in handy for signalling if you sight a plane or ship. In summer be sure that you have the mosquito net or insects will cause great discomfort.

Start your journey in the morning. Walk slowly with frequent rests. If the snow is deep or the going is hard you must take your time or you will become exhausted and freeze to death. Take time to prepare at least two cooked meals a day. If lost, follow a stream or the coast and you will have a better chance of reaching a habitation. Cold, hunger and fatigue will be your principal problems, so prepare yourself to combat them before you leave the airplane, and develop a sense of resourcefulness as you go along.

(Continued on Page 39)



1 *TO DEMONSTRATE a brand new fire-fighting technique developed at Wright Field by Army Air Forces engineers, an old wreck is saturated with gasoline and set on fire. From the direction of the wind, a newly designed fire truck rushes to the scene.*



2 *SMOTHERING streams of carbon dioxide come from the main boom nozzle, which extends ahead of the truck on a long armature. In front of the radiator is a nozzle which swings in a complete arc. Two bumper outlets spray CO_2 in front of the tires.*

Fire-Fighting Crash Truck Keeps 'Em Flying

By Pvt. Andrew T. Rolfe

"ONE pound saved equals four more bullets—enough to save a bomber—so keep it super simple," is a motto that confronts the engineers of Wright Field Equipment Laboratory's Miscellaneous Unit. A poster bearing this motto, the inspiration of Colonel Rudolph Fink, hangs on the wall of his office. Each newcomer to Colonel Fink's domain has this thought driven home to him before his assignment orders have rested five minutes on his new commanding officer's desk.

A recent life-saving development announced by the Equipment Laboratory is a new fire-fighting crash truck which smothers the flames of a burning plane in less than three minutes with thousands of pounds of carbon dioxide. This fire-fighting marvel appears to be a far cry from Colonel Fink's motto. However, it owes its success to the constant work of civilian engineer W. E. (Bill) Huffman, who ever since he resigned his first lieutenant's commission in 1920 as a dirigible pilot in the Army Air Corps, has devoted his time to aeronautical research at Wright Field—especially to making CO_2 containers light enough to be carried in aircraft.

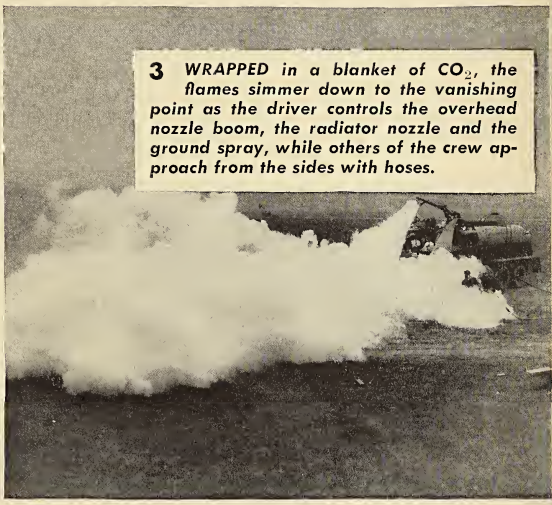
Huffman is the man who made the effective manually controlled engine-nacelle, carbon-dioxide cylinders which, since 1928, have extinguished many an airplane fire at a familiar source — the engine. His valves which stopped the old problem of having ice form in the neck by means of a constant speed control are now serving to inflate life rafts as well as putting out fires.

What has lightness got to do with a CO_2 carrying crash truck? The answer is plenty! To carry carbon dioxide in the amount needed to extinguish the flames of a crashed plane in the ordinary manner would mean that the Air Forces ground transportation engineer, Lieutenant J. C. Scott, would have to design a chassis of such gigantic proportions that the truck would be an awkward tractor-like contraption. Its lack of speed would impair its efficiency.

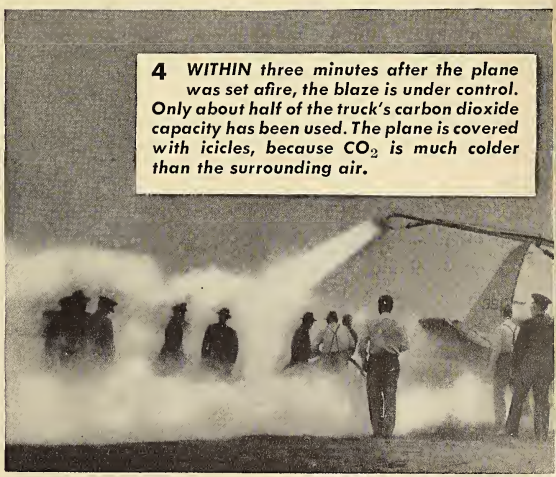
When Colonel Fink conceived the idea of a crash truck carrying enough CO_2 to extinguish a fire enveloping a plane, Huffman was ready to answer Lieutenant Scott's demand that the tank be light.

Working with the industry, Huffman found a way of keeping thousands of pounds of CO_2 at low pressure by refrigeration, thereby eliminating the necessity of a heavy pressure resisting tank.

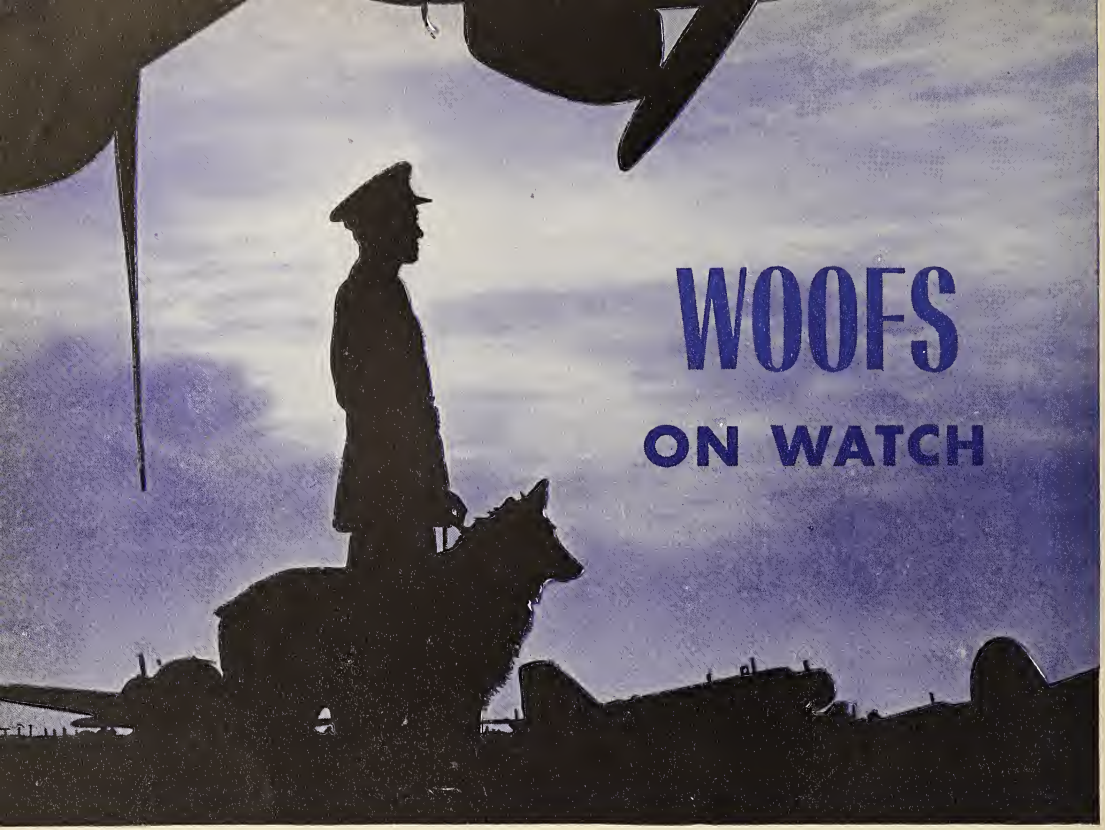
As a result of this research, the Air Forces now has a fast crash truck which can speedily reach the scene of a burning plane and put out the fire in a matter of moments. The prime purpose of this newest piece of fire-fighting equipment is to save lives. Salvage of the plane is secondary.



3 *WRAPPED in a blanket of CO_2, the flames simmer down to the vanishing point as the driver controls the overhead nozzle boom, the radiator nozzle and the ground spray, while others of the crew approach from the sides with hoses.*



4 *WITHIN three minutes after the plane was set afire, the blaze is under control. Only about half of the truck's carbon dioxide capacity has been used. The plane is covered with icicles, because CO_2 is much colder than the surrounding air.*



WOOFS ON WATCH

By Lieut. Harry P. Kelliher

Mitchel Field

Members of the WOOFS, also known as the WAGS, a new and very doggy branch of the Air Forces, have completed their basic guard training at Mitchel Field, New York, and now take their places alongside soldier-sentries to keep the secrets of this base from prying eyes.

From seven at night till seven in the morning, in all kinds of weather, these highly-trained dogs keep watch at their designated posts; and they can become "man's worst enemy" when the necessity arises.

The duties of the sentry dogs are to accompany a guard on post; to act as an extra pair of eyes and ears; to give warning at a sign of danger or the suspicion of an intruder; but to attack only on command. The dogs are particularly useful in isolated areas and where vision is restricted.

Sentry dogs are real MP's, being carried as such on the roster, and have service records of their own. They also draw rations, just like any soldier.

A number of these animals are at present on active duty at Mitchel Field. This group includes Doberman Pinschers, who have a high reputation as military dogs, Boxers, Collies, French Poodles and one Kerry Blue.

The job of selecting and giving the dogs their elementary training is handled by Dogs for Defense, Inc., a non-profit organization, according to Army specifications. Medium-sized breeds have proved the most effective. They are big enough to bring down a man and more alert than larger breeds.

While military dogs have long been used as sentries by European armies (it is estimated that Axis nations are using more than 100,000 military dogs), these are among the first so trained in this country.

The task of training dogs and Mitchel Field sentries to work together is handled by Staff Sergeant Richard Farnham, who has trained dogs and horses most of his life.

"This could be called a post-graduate course for dogs," Sergeant Farnham explains. "After the animals have thoroughly learned to execute the primary commands such as to heel, sit, lie down, stay, leap over obstacles, sound the alarm, charge and release the victim, strict obedience to the individual guard with which they work must be taught or the dogs will become a menace.

"Selection of the guards who work with the dogs is highly important," the Sergeant states. "Each dog is schooled with the minimum number of guards. Gaining the dog's full confidence is a prime requisite; men who are sympathetic to dogs must be found. These are working dogs, not pets, and no one else is permitted to make friends with them."

The Sergeant says that too often a well-meaning soldier will come up to the dog while on sentry duty to pat his head and make friends. The guard warns him but the reply usually is, "Don't be silly; I've handled dogs all my life, they know me." A couple of vicious snarls or a lunge changes the well-meaning soldier's mind.

The training method used is the "teasing" process. The "teaser" is the man who acts as intruder while the guard and dog practice.

Proof that the dogs are completely acquainted with what they are supposed to do is shown by the fact that the Sergeant, who has trained them, does not dare approach a post they are guarding unless the sentry-partner gives the OK. ☆

COMPRESSIBILITY

An Introduction to Aviation's "Bugaboo"

By Colonel Ben S. Kelsey

PRODUCTION DIVISION, WRIGHT FIELD

MEET compressibility—the now notorious "bugaboo" of aviation.

The semi-mysterious characteristics of this plain and simple physical phenomenon have all but placed it in a class with Gremlins and other mystical figures which are supposed to furnish airmen with embarrassing moments. Actually, compressibility has been with us since the earth was first surrounded by a layer of air. Those concerned with bullet design and acoustics have long been familiar with it, but compressibility didn't mean much to airmen until they attained speeds of 500 to 700 miles per hour, or close to the speed of sound.

There are all sorts of discussions on the subject of compressibility, varying from the pilot's barracks flying to expressions of learned scientists representing the most advanced thought of research laboratories. It would be impossible to discuss all the phases of the phenomenon, since a great deal of the region of flight concerning compressibility is still unexplored. But enough is now known about compressibility and its effects to remove much of the danger connected with it, and certainly enough to explain its character.

Compressibility, as it pertains to aviation, naturally divides itself into three phases. The first of these is a simple physical description of shock waves, their formation and character. This phase, in simple terms, is the nature and formation of sound as discussed in any elementary physics text book, and the similarity of shock waves and sound waves.

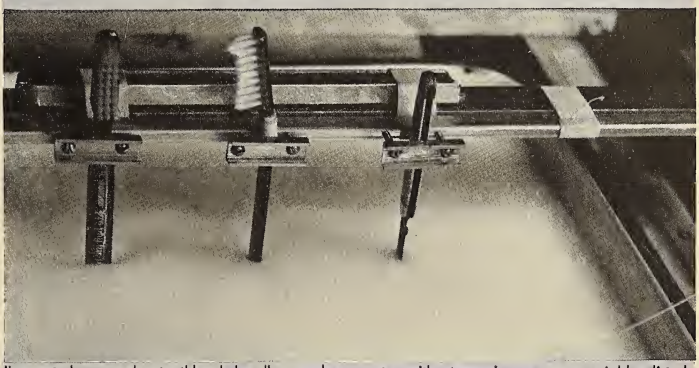
The second phase is logically the effect on an airplane in flight as it would be observed by the pilot; this phase concerns itself with the physical reaction of the airplane to the formation of shock waves.

The third phase involves a discussion of the problem which confronts the research scientist and the airplane engineer; namely, how to forestall, delay or overcome the compressibility effect.

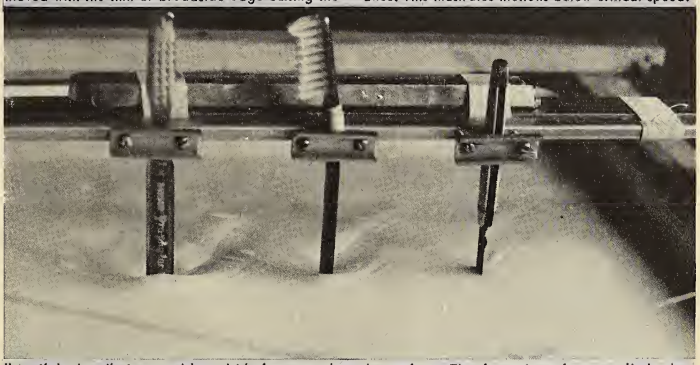
The entire problem of compressibility arises because of a peculiar characteristic of the air which causes sound to be transmitted through it at a definite speed. This characteristic of air is its ability to transmit waves.

We know that sound originates with vibrations and that these vibrations are transmitted somehow or other through the air, with the result that a corresponding vibration takes place when the sound wave strikes our eardrum.

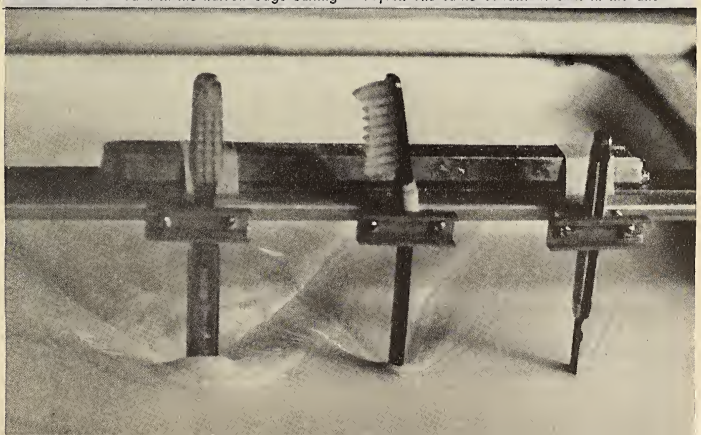
One can experience both objects and waves traveling together through the air at the same time. For example, standing on the cliffs of Dover we could watch the big German guns across the channel throw shells over to our side. After seeing the flash, we could count one minute and about fifteen seconds before the shell arrived. The explosion of the shell on our side would occur just a little ahead of the sound of firing—how much ahead depending on how close it hit. It is obvious that the shell traveled through the air *(Continued on next page)*



". . . at slow speed a toothbrush handle may be moved with the thin or broadside edge cutting the water without causing any appreciable disturbance. This illustrates motions below critical speed."



". . . if the handle is moved broadside fast enough to create waves (abave), the speed at which wave formatians start is a little less than is needed when the handle is maved with the narrow edge cutting the surface. The formation of waves (below) obviously is a functian af how much and haw fast the water has to flaw in arder ta get around the object. The same conditions exist in the air."



COMPRESSIBILITY

(Continued from Page 25)

faster than the sound waves caused by the blast of firing. Modern fighter airplanes can reach speeds, particularly when diving, that are comparable to the speed of shells and bullets. Bullets have long been traveling in this region of high speed above the borders of compressibility and have long been forming shock waves; we are fairly well acquainted with the pictures of shock waves which form at the nose of bullets traveling through air.

In high school physics we learned that sound waves travel like the ripples spreading out on a pool of water which has been disturbed by a stone dropped into the pool. We may have also learned that the vibrations causing sound waves actually compress the air in pulsations which transmit a series of waves; but instead of the sound waves moving a surface up and down as do water waves, the crests of sound waves are regions of compressed air (hence the term "compressibility") and the hollows are regions of reduced pressure. But the air itself does not flow with the wave any more than water flows with its surface waves.

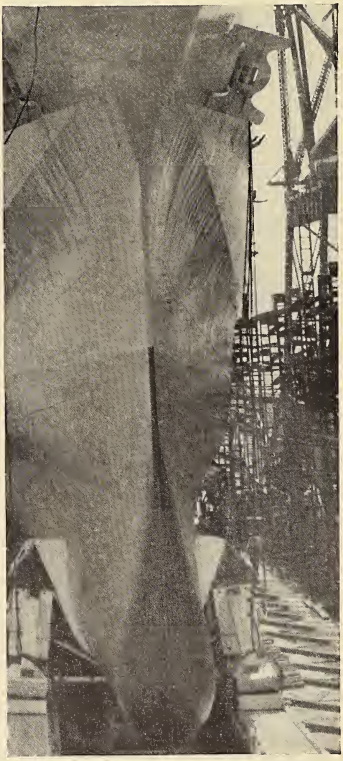
Having learned this in physics, we are in a fair way to understand that sound waves and shock waves are of the same breed. We probably all remember that the "speed of sound" was supposed to vary and was faster in solids and liquids than it was in air. We may have learned that the speed of sound in "standard" air is 1,090 feet per second, and that this represents the normal speed of transmission of the sound vibration. Actually, this is the speed of movement of the *wave*. Perhaps you did not realize that the speed of sound, even in air, varies under different conditions—varying primarily with the temperature. The speed drops with a decrease in temperature to the extent that in flight at high altitudes where the temperature is low a considerable reduction in this critical speed is reached.

THE well-known illustrations of the travel of sound in air serve to show that the speed of sound is not so very high, and that it is a very real factor. Many of us have waited for the sound to reach us after watching someone across the street strike a drill with a sledge hammer. Or we may have counted the number of seconds following a flash of lightning until we heard the thunder. We know that if we divide the seconds (between the lightning flash and the sound of the thunder) by five, we get the approximate distance in miles to the flash itself.

If we could move along through the air at the same speed as a sound wave it might seem as if we were riding the crest, or the hollow, or were in the midst of a pattern of waves similar to those around a boat. Perhaps it would be better to consider making our own disturbance or shock wave just as a boat creates the waves that move with it. In this event, these sound waves or shock waves—which are actually areas of bunched-up and thinned-out air—would stay with us, and if we could see them they might appear as definite as the waves on the surface of the water.

At speeds below that of sound, the air can move out of the way and can close in behind an airfoil without any appreciable compression or formation of a wave. At speeds above that of sound it might even be possible to move out ahead of the wave, leaving it behind, but we should still be concerned with the formation of the wave. Speeds above the speed of sound are relatively unknown except as applied to bullets and propeller tips.

In order to see these shock waves it is possible to take advantage of the variation in light refraction of the alternate regions of compressed and rarified air since the variation in light refraction causes light passing through to bunch up and produce bands of light and shadow when exposed photographically. We are familiar with photographs of these waves formed on bullets, and there are a number of such illustrations applying to airplanes and aerodynamic shapes. For the most part, however, it is necessary to imagine what occurs, or to use familiar illustrations which may not be, strictly speaking, scientifically accurate.



The sharp edge at the water line of our modern freighters, combined with a bulbous nose below the water line, serve to control the formation of the waves, thus saving power to put into speed.

A fairly complete study in compressibility can be made with a toothbrush and a bowl full of water. If the handle of the toothbrush is moved through the water at slow speed, the handle may be moved with the thin edge of the broadside cutting the water without causing any appreciable disturbance. In other words, at low speeds the water is able to move out of the way and back in behind the handle without creating waves. This illustrates motions below so-called critical speed.

HOWEVER, if the toothbrush handle is moved broadside fast enough to create waves, the speed at which wave formations start is perhaps a little less than is needed to create waves when the handle is moved with the narrow edge cutting the surface. This illustrates the fact that the critical speed depends upon the displacement, or the necessity for rapid recovery or flow-back-in after the passage of the handle.

It is obvious that a thin knife blade could move at a still higher speed than the toothbrush, but the surprising thing is that at one speed a knife cuts through with no ripple at all and then suddenly, with almost no increase in speed, a big wave formation sets up. Old Critical Speed himself pops up with a vengeance.

The formation of waves obviously is a function of how much and how fast the water has to flow in order to get around the object. The same conditions exist in the air, but, of course, at a much higher speed, simply because the air is lighter and can be pushed around with less effort.

It takes work to make waves. This can't be measured easily with a toothbrush handle but anyone who has ever stood in a row boat and rocked the boat to make waves knows that he can get tired just making waves without going any place. The effort required to move a boat is expended partially in overcoming the friction of the water on the bottom as it slides by, and partially in making waves. A well-known principle in crew racing is that the crew which bounces the boat up and down, making the most waves, invariably loses to the crew with the smoothest stroke. One has only to look at the bow wave of a blunt nosed freighter to realize that it must take a great amount of coal or oil to shovel that much water across the ocean. We are familiar with the bow-shape of our modern high-speed vessels with a relative knife edge at the water line and a more rounded and blunt nose built below the water line. This is to control wave formation and save power to put into speed.

The air, as we normally think of it at rest, is a rather docile medium. We know that we can walk through it without having to work very much to overcome simple air resistance at low speeds. We also know that as we increase our speed through the air we increase the amount of work required to shove aside the air and slip through it. When we reach the mysterious "speed of sound"

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We were in Vee of Vees all the way in to the target. The main formation was in Vees, and we, who were in the "rear guard," were in echelon of Vees, from left to right, inside the rear wings of the main formation. Our ship was "Tail-end Charlie." We were the rearmost left-hand ship in the formation, and hence the last to bomb.

We HIT scattered heavy (high altitude) "flak" on our way in, but it was slight, and did no harm. We got well over our targets, in formation and unmolested, when I heard the bombardier yell through the inter-phone, "Bomb doors open!—Left!—Right a bit!—Right hard!—Right, damn it! Right!"

I kept trying to follow his directions. It was tough because we were in the slip-streams of the ships ahead and it took a lot of rudder to keep Phyllis on the course he wanted. At last he said "Okay! Bombs away! Button her up!", which meant for me to get the bomb doors closed. Then he said "HIT-HIT-HIT on target!" It sounded fine.

The bombing part was easy. We'd got over the target and dropped them on the nose—by the grace of Lieutenant Komarek. All we had to do now was get back.

But that's when they started to pour it on. The open bomb doors had slowed us down a lot, and we were behind the formation. The German's strategy was obviously to pick on the last ship and shoot it down.

Most of the others got no attention at all from them. And I might say that I think it would be a lot better if the last ships in a formation were to slow down momentarily and let "Tail-end Charlie" get his bomb doors closed and catch up before they high-tail for home. You can get a lot of inter-protection from even two other B-17's. And we certainly needed it right then.

But there we were. Behind the others, pulling between 47 and 50 inches of mercury—a hell of a lot at that altitude—and trying to catch up, meanwhile taking evasive action. The flak was really being poured on. Heavy flak. I saw it below me, in front, and then above me. We were bracketed, and I knew that when it came next, they'd have us. They did. We started getting hits and plenty of them. I could feel the ship back and shudder each time they hit us. And I might say, incidentally, that one of the boys in the other ships saw them hit and destroy one of their own pursuits, an ME 109-G.

Things were happening fast, and it's a little hard to get them in their proper order. I'm trying to tell what occurred in about five seconds, but it's going to take a hell of a lot longer than that to do it. I was talking about their pursuits. I forgot to say that I had seen a dog-fight—or what looked like one—ahead and above me. Just a flash of it. That was when we were on the target.

Then came the flak, as I've said before. And then the hits. But after that came something worse. The flak suddenly stopped cold, and I knew we were in for it. That's the toughest moment of a bombing raid—the few seconds between the time the flak stops and the enemy pursuit comes at you. I found time to be scared, but not for long.

Just then all the gunners in the crew started calling through the interphone: "Enemy aircraft at three o'clock, Lieutenant! . . . At five o'clock! . . . At nine o'clock! . . ."

Sergeant Taucher, the rear gunner, was more specific. He yelled: "Hell, Lieutenant, they're coming in! From behind! There's a jillion of 'em! They look like pigeons!"

I said "Give 'em hell, boy!" or something like that.

He said, "I can't. My guns are jammed. I'm trying to clear 'em!"

"Keep swinging them around so it looks like you're firing." I said.

"Okay, Skipper!" Then, "I've got one gun cleared now." He started firing.

HE TOLD me later that once he got his guns going he didn't take his finger off the trigger from the time their formation started to come in until the last ship of it had gone out. They were employing two tactics that were new to me—and damned effective. When they peeled off to attack, they came in so close together that by the time one ship had shot us up and banked away, the next in line had his sights on us.

The other dodge they used was to pretend to come in on one of the other ships, and then do a twenty-degree turn and shoot hell out of us. And while Taucher said their fire came mostly from a range of about 1,200 yards, he also said that they were so close when they *finished* firing that he could see their faces. Mostly they came from the rear, but at least one of them got up under us from in front, stalled, and, as it fell off, raked us the length of Phyllis' belly. I could feel his hits banging into her.

As a matter of fact, I could feel the effect of all their fire. It was rather like sitting in the boiler of a hot water heater that was being rolled down a steep hill.

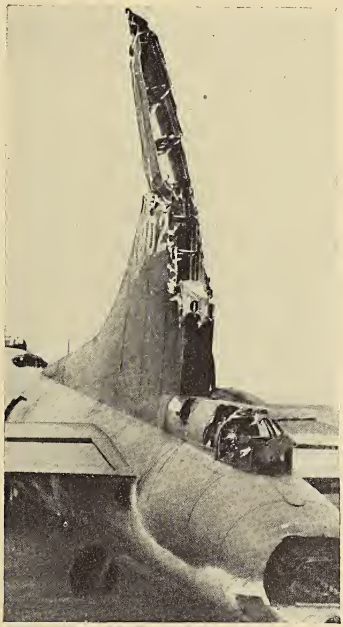
I began to realize that things were getting tough. There was an explosion behind me as a 20-mm. cannon shell banged into us just behind the upper turret and exploded; and I kept thinking, "What if it hit the flares?" If it hit the flares and ignited them I knew we'd go up like a rocket.

Then I looked out at the right wing and saw it was shot to hell. There were holes everywhere. A lot of them were 20-mm. cannon holes. They tear a hole in the skin you could shove a sheep through. The entire wing was just a damn bunch of holes.

I looked at Lieutenant Long, the co-pilot. That was a treat. There he was with his wheel shoved clear over to the right in a desperate looking right-hand turn which seemed, at the time, very funny because *my* control wheel was centered. I started to laugh and then decided there wasn't anything to laugh about. The position of his wheel meant his aileron control cables had been shot away. That wasn't funny at all.

About that time several other unpleasant things happened all at once. First, the waist gunner, Sergeant Peterson, yelled through the interphone: "Lieutenant, there's a bunch of control wires slapping me in the puss," which meant that the tail surface controls were being shot up. Second, the right-hand outboard engine "ran away" and the engine controls were messed up so we couldn't shut it off. Third, the left-hand inboard engine quit. And fourth, the ship went into a steep climb which I couldn't control.

I FORGOT to say that the whole left-hand oxygen system had gone out with the first burst of flak, and that I was trying to get the ship down to 20,000 feet to keep half my crew from passing out. I forgot to tell about this before because things were happening too fast to tell them all at once. Behind me there was a pretty nice little piece of drama going on that I couldn't see. My radio gunner, Sergeant Bouthellier, passed out from lack of oxygen, and the radio operator, Sergeant Parcells, seeing him lying by his gun, abandoned his own oxygen mask and put the emergency bottle over his face. Sergeant Bouthellier revived, just in time to see Sergeant Parcells pass out himself. He, in turn, took the emergency bottle off his own face, and revived Parcells. After that, on the verge of going out again, Bouthellier called through the interphone to tell me that the oxygen supply line was damaged. With Lieutenant Long's help I managed to



DESPITE a badly shot up rudder and tail assembly, this B-17—like Phyllis—also got back from a daylight raid over France.

put the ship into a steep dive and leveled out at 20,000 feet. At this altitude, everyone could keep going without oxygen.

To return to the fourth unpleasant thing that happened—when Phyllis went into a steep climb I simply couldn't hold her level. There was something wrong with the controls. I had my knees against the wheel and the stabilizer control was in the full-down position. The control column kept trying to push me through the back of my seat. I motioned to Lieutenant Long to help me and between the two of us we managed to get it forward and assume normal level flight.

Then I started to think. The enemy fighters were still shooting us up, we had a long way to go to reach England and safety, we were minus two engines, and it took almost full left aileron to hold that damaged right wing up. It was clearly time to bail out of that aircraft. It seemed a funny idea, but I decided it was the only thing to do. So I yelled into the interphone: "Prepare to ditch!"

Then I started to call the roll. Everyone answered "Okay, Skipper!" except the top gunner, Sergeant Coburn. Sergeant Peterson was badly hurt, but he answered, "Okay, Skipper", and even had time to ask me if I was wounded. He said, "How's the ship, Lieutenant?" I said "Okay." He said, "On second thought, what I really want to know is 'How are you'?".

I MIGHT say right here that it was the finest bomber crew that ever took off. The whole gang was right on the nose. Everyone did his job every inch of the way. I'm the one who is telling the story, because I was the guy in command. But there were nine other men in Phyllis, and any of them could tell you a better story of what happened. Phyllis had it all right; but so did her gang.

But to get back to what happened. I gave the order to prepare to "ditch" ship, with visions of a German prison camp in my mind. But just about that time Sergeant Coburn, the top gunner, slid out of the top turret, and fell to a position between me and Co-pilot Long. Coburn's face was a mess. He was coughing blood and I thought he'd been wounded in the chest. It later proved that he wasn't, but he was clearly in no condition to bail out of an airplane.

Things were tough right then. They were still shooting at us and the coast of France was a long way away. Our target had been about 60 miles inland and with our reduced speed—two engines out of action—it would take us quite a while to get to the coast. I felt a little sick inside. I yelled through the interphone that anyone who wanted to could ditch right then and there. But no one wanted to. Phyllis was still "airborne," as the British say, and I guess by this time they trusted her. Meanwhile, the enemy pursuit kept pouring lead into us, and there's no evasive action worth a damn you can take when you are shot up the way we were.

Lieutenant Long left his controls and went back to give first-aid to Sergeant Coburn. Immediately, I had the problem on my hands of keeping Phyllis from climbing through the ceiling. The damned stick just wouldn't stay forward and I kept on gaining altitude. I called for help through the interphone, and I'm sure that everyone on that ship thought I was injured. Lieutenant Komarek tried to get up through the hatch to help me; but he couldn't because Lieutenant Long and Sergeant Coburn were on the door in the floor through which he'd have to come. I didn't dare throttle the engines, either, for fear we'd just quit flying. Phyllis, at this point, had a stalling speed of about 160 m.p.h., in spite of her ambitious climbing tendencies. So I just fought her.

Meanwhile, Coburn was doing his best to bleed to death. Throughout, however, he never lost consciousness, and he kept making funny remarks.

Finally, the radio operator, Sergeant Parcells, came forward and took over the first-aiding of Coburn, allowing Lieutenant Long to crawl back into the co-pilot's seat. Between us we got Phyllis under control.

We were over the Channel by that time and some British Spitfires took us in tow. The Jerry pursuit stuff gave up and departed for home. We went into a dive from 20,000 feet for anywhere on the coast of England.

The runaway engine gave us a lot of trouble. The electrical system was shot to hell, and we couldn't shut it off. Long tinkered with the fuel valve but no soap. I was afraid to tinker with the fuel valves. Finally we gave it up. Phyllis was still flying, and I didn't want to ask her too many questions.

We made a wheels-up landing at the first aerodrome we saw in England. We could only make left-hand turns because both Long and I knew that if we ever got that shop-up right wing down we could never pick it up again.

I buzzed the field once and scraped a chimney or two off some buildings at the end of the runway. I knew we were going to have to crash-land because the hydraulics were shot, and I couldn't get the wheels down. Besides, I didn't want to land Phyllis normally at 160 m.p.h. She'd have coasted clear across England.

So we belly-landed her. The long way of the runway and cross-wind. It was a damned fine landing—marred only by the fact that Coburn, the wounded man, kept making remarks about how tired he was of flying. Sarcastic remarks. I promised him that I'd put him on the ground and was lucky enough to do it in good shape. We all walked away from that landing. Belly-landing a B-17 is an art, and both Long and I agree we have mastered it. Sergeant Coburn agrees, too.

And next time anyone tells you a Fortress can't take it, give them the works. As one of the boys said after we got back: "Phyllis had the stuff." God rest her soul.

Oh, yes, Komarek, the bombardier, got sick after we landed. But he was considerate about it. He took off his flying helmet and used it as a receptacle so the kids that dismantled Phyllis wouldn't have to clean up after him. We all laughed like hell about that. ☆

THE BOYS WHO KEEP 'EM FRYIN'

By Pvt. Mort Weisinger

AN ARMY travels on its stomach, and to make certain that the stomach isn't lined with tough-as-leather beef cuts, the Army Air Forces are monthly graduating hundreds of student cooks from Baker and Cook schools throughout the nation. Culinary cadets who have never known a calorie from a vitamin are being taught literally to cook with gas.

For two months these white-clad "grease monkeys" ride the range of a stove, finally emerge qualified in the arts of stewing, sauteing, simmering, braising, fricasseing, roasting and baking.

These captains of the chow go in for soldier-like strategy. The science of decoy is mastered, and student cooks learn how to bait appetites by garnishing dishes with a variety of colorful vegetables. A green pepper ring, the scarlet splash of paprika on a boiled potato, spinach's green complemented with the luring yellow of sliced egg — all these tricks from the Army's recipe to win appetites and keep its men well fed.

"When the menu calls for hamburger, and the men have had hamburger recently, I camouflage it", one alumnus cook told us recently. "I make chili con carne out of the meat, or make stuffed green pappers."

The business of salvage and the elimination of waste in the kitchen is also important. "When we have pancake batter left over from the morning's breakfast, we use the surplus batter to make corn fritters for dinner", this same chef told us. "And if the rice doesn't go over at dinner, we make a rich rice pudding out of it for supper", he added.

A graduate baker joined the conversation. "I've just had a two months' loaf (meat) on the government's dough", he flipped. He waved his diploma at us. "Honest", he said, "I'll make some girl a good wife. I can make biscuits, bread, pies, buns, and doughnuts."—*Atlantic City Beam.*

Here's how new B-17s are tested by the Army after they roll off Boeing's production line—on their way to the wars.

Capt. Hansen adjusts the controls of a B-17.

By Captain Harold R. Hansen

Chief, Army Production Engineering,
Boeing Aircraft Company

WHEN a B-17 is wheeled off the Boeing production line, it undergoes two tests—a company test and an Army test.

These differ considerably.

The Boeing check-up is primarily functional. First, a company pilot and co-pilot take the ship up alone for a period of twenty to forty minutes. Cruising slowly at three to six thousand feet above Boeing Field, they carefully analyze the plane's performance in flight, making sure that props, engines and controls function properly.

After this, they land and pick up a crew of company electricians and mechanics. Then follows a flight of an hour or more, during which countless adjustments of regulators and equipment are made.

All irregularities and malfunctioning of equipment or accessories which cannot be corrected in flight are noted by the company pilot. These are then corrected by company ground mechanics and "signed off" by Army inspectors.

The B-17 is now turned over to the Army B-8 Inspection group. The term "B-8" comes from the number of the Materiel Center directive which requires a complete and very searching inspection of 428 individual items. In addition, the B-8 Group inspects about 150 more items which become accessible as cowling, panels and doors are removed to get at the 428 basic articles and assemblies.

Again discrepancies are noted which will be corrected by company mechanics and "signed-off" by Army inspectors.

The big bomber is now ready for the Army acceptance flight.

Another Air Corps man and I have been waiting in the Pre-Flight Flight Operations Office. Sling a chute over your shoulder, come along with us, and we will try to give you some idea of how this airplane is tested before it's sent off to the wars.

WE find a lot of traffic on the field. Seattle weather is unpredictable, with plenty of fog, but today is clear and the runway is warm with landings and take-offs.

Riding across the apron in a station wagon, the Boeing operations man hands me the company pilot's report. I ask him, "Which ship are we flying?"

Before we get into the ship, I very carefully read the Boeing flight report. Everything is reported in order.

Next, we examine cowlings, especially the outer sides, which cannot be viewed from the cockpit. The object is to see that no Dzus fasteners are loose. If they were, they might fly off and rip the devil out of wing or tail surfaces.

We look at the turbo intakes and landing gear to be sure no rocks or foreign matter clog them, and check the landing strut against hydraulic oil leaks. Along the way, we observe that the brake hose sets at a proper angle.

One propeller blade shows a nick, probably made by gravel. Where you find one, you will usually find more on other props. That's the case. The co-pilot makes a note on the flight inspection report to dress out all nicks.

Incidentally, we have two reports to write. One, the Flight Test Check Sheet, shows how thorough our examination of the airplane will be. Eleven items must be checked, as follows: (1) flight controls, (2) propellers, (3) radio equipment, (4) engine and turbo operation, (5) automatic flight equipment, (6) wing de-icers, (7) hydraulic system, (8) heaters and defrosters, (9) electrical system, (10) flight instruments, and (11) power turret operation.

The second sheet is the Pilot's Inspection Report, which is simply a memorandum of irregularities discovered on the flight, with corresponding spaces to be filled in by plant mechanics who will correct the faults and by inspectors who will approve the work.

Boarding the plane by the side door, our inspection continues as we move forward to the pilot's compartment.

The tail wheel strut? O.K. Miscellaneous equipment—is it all anchored down? Yes. While we have elbow room, we don our chutes and make certain they fit right. Moving into the radio *(Continued on next page)*

ARMY BOMBER—OK

(Continued from Page 29)

compartment, we run our eyes and our fingers over the wiring and check all instruments. Calibration correct.

Into the pilots' seats now and the first thing is to check the gas. The tanks are filled but the tiny gas warning light doesn't operate and we make a note to have it fixed.

On 1 . . . On 2 . . . On 3 . . . On 4—one after another the engines are started and, while they warm up, we call the control tower for taxi and take-off instructions.

Try the brakes. They hold but seem a bit too weak. A memorandum is made to tighten them. Next to be tested, in order, are prop governors, turbos, manifold pressure and RPM. Everything normal. For a minute or so, we run oil through the propellers at high pitch, so it will flow properly, and then test individually each magneto and each engine. Board instruments are carefully watched for inaccuracies and we make certain that the blue lights from which luminous dials and indicators reflect are in proper working order.

Strap into the seats now, for the plane is ready to take off. We taxi down to the far end of the runway. "Use all the runway you've got" is still one of the wisest slogans in the business.

ONCE in the air, we bank sharply over the ridge of hills that flanks Boeing Field on the east and, as we climb, all generators and batteries are checked. O.K.

The radio compass needle is wavering. We are above a radio station and, as we fly over, the needle swings exactly to 180 degrees. The marker beacon light is burning.

The snowy peak of Mount Ranier lies a few miles ahead as we cruise south at about 160 miles an hour. We won't fly higher than 6,000, probably, nor very fast. There's no point.

Tiny rivers of propeller de-icer fluid on the engine cowling show that it is flowing correctly and the rubber wing de-icers breathe in and out regularly, just as they should. Oil pressures and temperatures are both about right, as are the fuel pressures and cylinder head temperatures.

Now we *very carefully* trim the airplane for straight and level flight, paying particular attention to the ball in the bank and turn indicator. It is imperative that the B-17 be perfectly trimmed, or our automatic flight equipment—which we are now about to test—will not function properly. We then center the airplane, flying straight and level with hands and feet off the controls, and we extinguish the "tell-tale" lights by adjusting the aileron, rudder and elevator centering knobs, in the order named. As the "tell-tale" lights are extinguished each of the engaging switches are immediately thrown "on."

This is the most important part of our flight, from the Army's standpoint. Company pilots are not permitted to fly with secret equipment. Certain Boeing mechanics are trained on it, and one of them is along with us on this flight, riding in the bombardier's compartment, making any necessary adjustments. Few are needed. We bank at a 30 degree angle to the left and then to the right. The plane levels out smoothly each time.

This automatic equipment, like many other things, will require adjustment in the field, of course. But it is our job to be sure it's right to start with—that, above all, there is no faulty gyro.

While we have the airplane flying on the A.F.C.E., we put it into a bank to the left and then to the right to such a degree that the bank and turn indicator is registering a one-needle-width turn. We now check the amount of turn for 120 seconds; if the rate is not three degrees per second the bank and turn indicator must be replaced and readjusted.

Taking the controls again, we feather the props and stop the engines. One after another they are switched off, until we are flying on various combinations of three engines, then two engines, and finally on just two engines of either wing. The plane performs well under all circumstances.

Our flight is just about over. We have been gone 30 or 40 minutes, checked all vital controls, instruments and equipment. There are six irregularities, all of which have been noted on our inspection report. They are minor, however, and the airplane will not have to be test-flown again. It will merely go back to the plant for correction of the minor flaws and further inspection. Had we found a major irregularity, the ship would be taken up once more.

But Number 53 is in good shape. In a day or two at most it will be ferried away by a pilot of the Air Transport Command. Later, perhaps, it will be assigned to you. ☆

Americans Can Still Shoot

A TALL man with Captain's bars on his shoulder watches closely as the gunners aim and fire at clay pigeons. Now and then there's a slight lull in the proceedings and he slips a shell in his own gun and calls "Pull!"

A bird sails out. It breaks into bits with the Captain's shot, despite the fact that he hasn't bothered to raise the gun to his shoulder. From his position 25 feet behind the trap the Captain has shot from the hip.

This is Captain Phil Miller, one of the best trap shots in America, now technical advisor in charge of all shotgun ranges at the Army Air Forces oldest Flexible Gunnery School at Las Vegas, Nevada.

Captain Miller has been shooting and teaching others to shoot for more than 30 years. He won his first major trap shoot in 1915 and then for a decade walked off with practically every shooting award in both professional and amateur competition. Then in 1925 he decided to retire.

But nine years later Captain Miller came back. At the Grand American in 1934 he broke the first 200 straight. In 1937 he won the Amateur Clay Target Championship and a year later the National High Average Title. In 1939 he won the Grand American all-round Championship and was named captain of the All-American team. At Las Vegas, the Captain is somewhat surprised but nonetheless pleased to see that recurrent phenomenon, The American Eye, in action. "There must be something in our blood," he says. "Even after a generation of city life our boys have not forgotten how to use a gun. We're closer than we think to the pioneers."

Captain Miller finds that there is no class or region which holds a monopoly on the tradition of the shot gun. Generally speaking, of course, country boys take to training more readily. Captain Miller tells of a Georgia private who had never seen a trap in his life before he walked on the Las Vegas range. He promptly broke 50 out of 50. The answer? He had been shooting rabbits "down home" as long as he could remember.

Conversely, the Captain counters with the story of a Boston city slicker who beat the pants off a Virginia duck hunter. They come from everywhere. A piano player, the Captain discovered, makes a first class gunner. So do billiard experts and golfers. Anyone whose eye and hand are already accustomed to functioning together knows what to do with a trigger and a target, Captain Miller has found.

The trap and skeet ranges are an integral part of the aerial gunnery training course at Las Vegas—a course which manages to combine the best elements of a sweat shop and a university. The Captain, at 49, has been through the entire gunnery schooling, from the first classroom lecture to the final phase—plane-to-plane firing. He has a diploma which states that he is a qualified aerial gunner. And he has gunner's wings.

Captain Miller has very little time for relaxation, but occasionally on Sundays he gets a few hours off. That is the time when he does what he enjoys most: He rounds up a couple of other officers and together they visit the trap ranges to—you guessed it—"kill" a few clay pigeons. ☆

The Burma Roadsters Delivered the Goods

By A. R. Strang

WRIGHT FIELD

YOU no doubt are familiar with the Short Snorters Club, but perhaps you haven't heard about that chapter in the Far East known as the "Burma Roadsters."

To claim membership, you must fly or drive over the Burma Road. Not everyone is eligible, of course. The Japs have been flying over the Road for some months now—but not a Jap has been asked to join. And this slight has made them furious.

That brings us to Captain Jon A. Laird, a veteran Burma Roadster, and the two impressions he brought back from the Far Eastern hunting grounds. Captain Laird left the Burma Road area last July to take his present post as Assistant Engineer Officer of the Accelerated Service Test Branch at Patterson Field, Ohio. Neither of the impressions he brought back are military secrets. The first, his theory about the unfriendliness of the Japs, was acquired while hauling freight above the Burma Road across the Himalayas from India into China and return in a C-47 transport. He has very definite ideas about that one.

The second impression which can be related safely is that three rupees was too much to pay for the baby King cobra he bought to bring back as a pet. Under the fakir's persuasion, the baby snake proved that it could raise a good part of its 10-inch length, flare its hood and strike. But its body was almost transparent. Captain Laird's suspicion that it lacked guts was confirmed when the snake died at altitude over the South Atlantic in a Clipper.

Like many critical operations at Army Air Force outposts, the job of lugging freight over the hump was never a joy ride. The heavily-laden C-47s, in the hands of airline pilots who had been hurriedly recalled to active duty in March for this express assignment, often accomplished the impossible. Or so it seemed to the Japs in Nakajima 96s, armed fighters with a speed of 270 miles per hour at 17,000 feet.

By any comparison on paper or in the air, the Japs should have had a field day. Armed only with tommy guns, the converted DC-3s cruised at about 140 miles per hour. The route was too long for fighter escort. Interception from the Jap's base, within easy striking distance across the Burma border, should have been a military certainty.

"From our base in India, a series of 12,000 and 14,000-foot peaks stretched northeastward toward China," Captain Laird explains. "Out there, they call them either the HiMALayas or the HimaLAYas. Off to the left the peaks reach 22,000 feet. Between these jagged upturned fingers are valleys with sheer rock sides through which the monsoons boil down from China in the spring and from the other direction in the fall. We encountered quarter and cross winds up to 100 miles per hour and higher.

"We tried to maintain 16,000 feet all of the time, but it was not always possible with the loads we carried. Going in, we carried ammunition, spare parts, chemicals, machinery, medicine and food from the Indian railhead to Kunming. En route, there was an army of 70,000 Chinese which had been cut off. We dropped rice to them regularly.

"Coming out of China, the loads were just heavy—Army and Navy personnel, diplomats, evacuees, war correspondents. They rode along even though they knew there was oxygen only for the pilot and co-pilot, and that we would hunt the dirtiest weather we could find, for the first 3½ hours at least, to lessen the chance of being intercepted.'

Although they were always in there trying, the Japs, up until the date of Captain Laird's departure, had not bagged a single Burma Roadster C-47. His explanation for this embarrassing score pays tribute to the Chinese.

"Our real protection," he reports, "other than plenty of bad weather, was the best air raid warning system in the world, in my opinion. It's uncanny how those Chinese men and women—and even the children—detected and reported Jap planes over Chinese territory. They were always on the job and had lots of short wave radios.

"Their warnings constantly kept us informed where the Japs were flying, how many and what kind. This gave us time to duck into the clouds, or in clear weather to drop down into a valley and circle until the 'all clear' came, hoping that we wouldn't be spotted. Lacking the speed to run away from the Jap fighters, some of us came back safely after eight hours in a valley or running in clouds. The Japs would never come into a cloud after us."

"General Chennault's AVG's, with the fall of Rangoon, had withdrawn to secret bases in China. They had good hunting around Lake Tali, where the Japs were bombing a Chinese resort almost daily. None of us knew why. But since Lake Tali was directly on the air cargo route, the Burma Roadsters were very glad that the AVG's were not permitting the Japs to linger in that area when freight was going through.

"One day we were over the Burma-Chinese border, tuned into the AVG network," Captain Laird recalls, "when we got a warning that a formation of 18 bi-motored Jap bombers with a fighter cover was 40 miles away. There was a broken overcast, not enough for good cover. So I dropped down into a valley and circled for the better part of an hour. Suddenly, through the haze, a plane, followed by another, pulled up over the lip of the next valley and scared hell out of me. I pulled away, heading for my destination and expecting company at any moment. I heard two AVG's talking to each other, something about 'that Number 37 is mighty lucky. He was hiding down there in a valley while 20 Japs were setting 4,000 feet above but they didn't even spot him.'

"Thirty-seven happened to be the number of our plane.

"Back at our destination, I learned that the two planes which had come at us from the next valley were two of our cargo ships which neither the Japs nor the AVG's had seen. Little wonder that the Burma Roadsters believe they owe their lives to the alertness of the Chinese."

All in the Life of Burma Road Cargo Pilots

IN THE early months of war they kept the Road open by dodging Japs and flying freight in C-47 transports. Ground transport (below) . . . on downhill dunes, it fairly flew. In the Far East planes make camel transportation like this look just as slow—well, just as slow as it looks. Now and then, as pictured below, overloads and short runways had this effect. But parts were borrowed from another plane so this one could proceed to India.

Technique

A Monthly Review of Technical Developments in the Air Forces

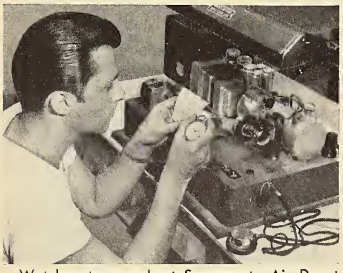
Watchmasters Keep Air Forces On Time

IT IS OBVIOUS that the split-second timing of Air Force operations makes it necessary for the watches used by aircrew members to tell the exact truth. It is also obvious that the village jeweler's time-honored method of regulating his customers' watches by checking them with a master clock, sometimes for weeks, is out in the kind of fast-moving warfare that is being fought today.

The Army Air Forces' answer to this is the "watchmaster" — an instrument that makes it possible to regulate a watch to 100 percent accuracy in less than a minute. No master clocks play a part in the method. The exact speed of the timepiece being tested is figured mathematically by a sound-excited printer on a graph moving at constant speed.

A straight, smooth line on the revolving graph means the watch comes up to Air Force standards. A rising line means the watch is fast, a falling one that it is slow.

To assist the repairman locate the trouble in an imperfect watch, the watchmaster is equipped with an earphone. This is to the repairman what a stethoscope is to a physician. With the graph it diagnoses the ills of a timepiece all the way from a simple cleaning job to a cracked jewel or defective mainspring. Guesswork is completely eliminated.



Watchmaster graph at Sacramento Air Depot reveals a slow watch with mathematical skill.

The watchmaster is especially valuable to navigators over the Pacific where there are no radio beams to follow, and where it is necessary to know the exact time to make readings from the sun and moon.

Portable Hangar

for Task Force use

A NEW PORTABLE HANGAR, developed by the Engineer Section of the Directorate of Base Services, has gone into production. The new hangar is designed for use in all theaters of operations for the repair and storage of airplanes, supplies and equipment, or to house and hospitalize troops in the event of an emergency.

The frame of the hangar is of cold formed steel and the coverings and end doors are of a specially treated dark canvas, opaque to light of low intensity, waterproof and flame resistant. In cold climates local wood sheathing can be substituted for or added to the canvas covering, thus obtaining additional insulating qualities. The size of the hangar can be adjusted to fit almost any need by simply adding or subtracting bays.

The normal-sized portable hangar weighs about 52 tons, is 35 feet high. The canvas covering and steel frame can readily be broken down into small bundles for ease in shipment. Experience in erecting the hangar indicates that unskilled troops can put it up within three or four days, and that it can be dismantled in much less time.

A portable, oil-fired, circulating air heating unit has been specially developed for heating the hangar.

Below is the Air Forces' new portable hangar.

Rolls Royce by Packard

STUDENT mechanics at Selfridge Field, Michigan, are learning about the Packard-built Rolls-Royce 12-cylinder V-type engine direct from the people who make it. This has been made possible by the Field Service and Service Instruction Department of the Packard Motor Company, which has donated the services of three instructors and much valuable equipment to the job of teaching Selfridge soldiers how to maintain the American version of this famous British engine.

The course given by the instructors is one of many arranged by Colonel William T. Colman, Commanding Officer of Selfridge Field, for the Air Service Command is to train ground troops to operate under field conditions—without the conveniences of permanently established bases. A typical class scene is shown above.

As a result of Colonel Colman's arrangement, there is little Selfridge mechs do not know about the Rolls-Royce—the power plant of the P-40F and a number of other Allied planes.

Among other things the mechanics have learned that the Rolls-Royce engine is not something new—it was designed about thirty years ago in England, and is even now *basically* the same as it was before World War I. Naturally, because of the demands for more power and high altitude performance, improvements have been incorporated. For one thing it has been necessary to add a reduction gear and supercharger of the two-speed type—low is 8.15 to one for altitudes below 13,000 feet and high is 9.49 to one for altitudes above 13,000 feet.

—*Capt. Richard M. Ramey*

Progress: Airplane design is not all that has advanced in the Air Forces since World War I. There has also been progress in other, supporting fields.

Typical of this progress is the steady advancement in the design and capacity of aviation gasoline trucks, vividly illustrated by these pictures. At left is shown a 100-gallon trailer, used to refuel the Handley-Pages and Sopwith Camels of World War I. Ready to pull this tank to the flight line is one of the then "latest" types of mechanized ground equipment—a Model "T" Ford.

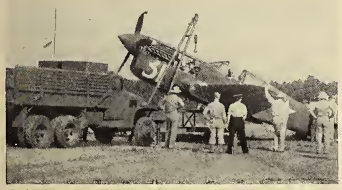
As the airplanes got bigger and better, so did the gasoline trucks. The center picture shows a 600-gallon truck of 1928 vintage bringing gas and oil to a Keystone bomber. At right is a modern 4,000-gallon gasoline truck and trailer, used to refuel the largest of Army Air Forces planes. It can "gas up" a Flying Fortress quicker than the 100-gallon tank shown at left could fill the baby gasoline container of a Sopwith Camel.

New Truck Hoist

A PORTABLE HOIST that can easily handle an 8,000-pound plane has been developed by Lieut. Col. James H. Reed, Jr., Commanding Officer of the Sub-Depot, Morris Field, North Carolina.

The hoist is designed for use on winch-equipped, two-and-a-half-ton government trucks. It is made largely from two iron pipes three and a half inches in diameter, and wire cable. The cable is used to anchor the hoist to the truck.

When in use the hoist rests on the truck's front bumper, with detachable supports used to prop it up. The wire cable is extended from the top of the hoist entirely around the body of the truck, and fastened in the rear with clamps. When not in use the hoist is supported from the side of the truck by means of brackets. When needed



Colonel Reed's portable hoist lifts a wrecked P-40.

it can be slipped off these brackets and on the bumper in less than five minutes.

The total cost of the unit is under $200. In most cases it will do the work of a much more expensive wrecker truck, even though it is much easier to handle and much cheaper to operate. It can be used for a number of different purposes, including lifting wrecked planes to place them on trailers, for changing engines, and for actually moving wrecked planes from runways and fields. In this case wheels must be used under the front bumper in place of stationary supports.

The Sub-Depot at Morris Field will furnish prints and drawings of the device to any squadron or Air Forces unit requesting them.

Van Slyke Technique—Here's what some of the soldiers behind the battlefronts are doing. The scene above is the high-altitude pressure chamber at Wright Field, and the hand on the face of the altimeter in the center of the picture shows that the men are in the low-pressure atmosphere of 40,000 feet. In the foreground Major David B. Dill, high altitude scientist, has just taken a sample of blood from the arm of Staff Sergeant Thomas Green, while Staff Sergeant George E. Hohenshilt swabs the puncture. The sample will be tested by the Van Slyke technique to show the effect of extremely high altitudes on human blood. Experiments like this help airmen to penetrate to higher and higher altitudes with safety.

Jack and Dolly

THE INGENUITY of Captain J. N. Hudgens, Sub-Depot Engineering Officer at Drew Field, Fla., has greatly increased airplane maintenance efficiency at that station through the invention of inexpensive time- and labor-saving devices.

Two popular inventions of Captain Hudgens are a man-powered tripod jack that saves wear and tear on the expensive hydraulic jacks used in airplane repair, and a four-tier movable repair tray, known as a "Tray Dolly."

Captain Hudgens' jack was made from angle iron and heavy gauge pipe. It stands on a three-foot triangular base, is 52 inches high, and has an adjustable horizontal pipe attachment approximately an inch and a half in diameter. There is also a metal pin that is used to hold the jack at desired heights. After the parts of this jack are cut to the proper lengths they can be welded together in little more than an hour.

Although it took him only a few days to invent it, Captain Hudgens believes his jack will last a lifetime if it is not overloaded. So successful has it been that, since the first one was constructed many more have been made and put in use by the Drew Field machine shop.

The Tray Dolly is made from scrap lumber. It is used as a place to shelve airplane parts during repair, thus keeping them off the floor where they may become misplaced,

Capt. Hudgens (left) and the tripod jack.

dirty or bent. Tray Dollies can be marked with chalk numbers so mechanics know to which plane they belong. Castor wheels permit them to be moved easily to any part of the hangar when they are needed.

The tray dolly protects plane parts.

This is how P-40s get around before they have wings to spread. The scene is an Air Forces materiel receiving center, where the plane has been brought for final assembly and delivery to the Army. The trailer was specially built by Curtiss-Wright for this journey from its factory to the Air Forces "induction" station. After final assembly here, the plane is ready to be flown to the squadron to which it has been assigned.

Captain Parker demonstrates his salvage machine.

Can Salvage Machine

SALVAGING tin cans may seem like a very minor part of winning a war, but at a place like Cochran Field, Macon, Ga., it can get to be quite a problem. Cochran has been using up tin cans at the rate of 50,000 a year—enough to make salvaging really worth while, but also very difficult.

In fact, up until a few weeks ago it was taking four men two and one-half hours a day to cut up and crush used cans in a manner suitable for salvage. What's more, they were using up $25 can-openers at the rate of three per month.

This was the kind of situation that to Captain Sheldon C. Parker (above), mess officer at Cochran, constituted a challenge, and he did something about it. The result is a new machine that cost only $12 to construct, and which has cut the time spent in salvaging cans at Cochran in half. It is made of molybdenum, one of the hardest of metals, and after more than three months, has shown no appreciable sign of wear.

Captain Parker's machine is set upon a table of steel. A jagged tooth die is set into a plate which is fixed on the table, and another one is set in an upper plate that can be brought down by operating a hand lever.

The dies of Captain Parker's salvage machine have been made in three sizes, making it possible for the machine to cut up 95 percent of all cans issued by the Army quartermaster. The dies are easily interchangeable; pins hold them in place, and no tools are needed to insert or remove them.

For Better Maintenance

THE aircraft maintenance record of Lemoore Sub-Depot, Lemoore, California, has been greatly increased during recent months by means of an awards system developed by Lieut. Col. F. H. Barber, Commanding Officer.

The system is simple; it consists of awarding a plaque each month to the squadron turning in the most efficient maintenance record. The record is computed as follows:

Each month the average number of planes in commission in each squadron daily is divided by the average number of planes assigned to each squadron daily. This gives the percentage of planes that were in commission in each squadron during the month for which the award is to be made. When a plane is laid up through no fault of the squadron maintenance men (such as from a shortage of spare parts) it is counted as being "in commission" as far as the award is concerned. Colonel Barber's "awards chart" looks something like this:

School* Squadron	Av. No. Planes on Hand Daily	Av. No. Planes in Service Daily	Percentage of Planes in Service
First	32.74	32.37	98.59
Second	32.88	32.53	98.94
Third	30.11	29.53	98.07
Fourth	32.84	32.03	97.53
Fifth	32.84	32.57	99.18
Sixth	24.69	24.27	93.30

* Squadron numbers are fictitious.

In this competition, the Fifth School Squadron would be adjudged the winner.

PICTURE CREDITS

12-13: Sovfoto; British Ministry of Information; British Combine; Rudy Arnold. 14: British Ministry of Information. 25: Lockheed Aircraft Co. 26: Rudy Arnold. 27: Associated Press. 29: Boeing Aircraft Co. 34: Rudy Arnold. All other photos secured through Official Army Air Forces sources.

Inexpensive Bombing For Civil Air Patrol

MANY small Civil Air Patrol planes covering long reaches of the American coastline are equipped with inexpensive but effective bomb racks and bombsights invented by Major Lester G. Orcutt while he was stationed at Morrison Field, Florida.

The bomb rack was designed, built and installed on a Stinson 105 in 48 hours, at the request of Army Air Force Headquarters. It was built to carry 100-pound demolition bombs so CAP planes could blast subs they spotted on their daily patrols.

Pilots who flew the planes soon wanted a bombsight so they could aim their bombs. Two days later Major Orcutt had turned one

Major Orcutt's bombsight, in position.

out. The materials only cost 20 cents, but it was effective up to 3,000 feet. So successful was the bombsight and racks that they have since been produced en masse for light patrol planes in all parts of the country. For certain special purposes it has even been used on occasion in regular military planes.

Major Orcutt's bomb rack is a metal frame attached to the right lower longeron. The release lever is placed on the floor of the

The bomb rack in use, holding 100-lb. bombs.

cockpit right in front of the co-pilot's seat. Since the first design, the rack has been improved so that it can carry two demolition and two smoke bombs.

The bombsight is made of metal and consists chiefly of two adjustable sight rings. It is attached on the outside of the cockpit door of the small planes for which it was designed. The positions of both the sight and the racks are shown in the accompanying photographs.

(Continued from Page 3) 293 enemy planes, probably destroyed another 150 and have damaged 192. That is a record unequalled by bombers of any other nation. However, we must not rest on our laurels and think smugly that all is well, for we know it will not be long before the Germans come out with an answer to our Flying Fortresses, and we must be ready for it.

For a long time, we had our P-38s in England and tried vainly to get them into a fight to determine just how good they were. The Germans would not close in and fight. Recently, however, the Germans have fought us in the area over Tunis. To date the P-38s have held their own, even though they have had a very difficult task. They have covered and protected the ground troops, and at the same time met the German ME109 and FW190 fighters. The number shot down has been about even, so we are satisfied.

From Air Marshal A. T. Harris, RAF, to Lieutenant General H. H. Arnold, AAF:

By the first anniversary of Pearl Harbour the Japs are already paying dearly in the Solomons and New Guinea for their infamous assault. The Italians who begged a share in the destruction of London (with pitiful results) cannot take even our minor air offensive and are evacuating their cities in panic. It now remains for Germany to feel the weight of combined allied bomber attacks. The Reich will have plenty of new scars to show by December 7th, 1943. Greetings and good luck to the U.S.A.A.F. from Bomber Command.

If we can always shoot down plane for plane with the Germans, it will not be long before we have definite air control, for we cannot only produce more planes than they can but we can also turn out more and better combat crews.

I TELL you now that both the German and the Japanese Air Forces are on the down grade. They have passed their peak. We are just approaching our peak in airplane production and combat crew training. Our plane production alone is more than that of the Germans and Japanese combined. We have in addition the production of the British and the Russians. So despite the long pipe lines which we must keep filled, our enemies are playing a losing game in the air. They are reluctant to meet us in an all-out combat and yet if they do so meet us, it marks the end of their control of the air, even over their own countries.

Now just another thought about this airwarfare. Few if any of us have had time to figure out just what effect our Army Air Force planes have had upon enemy warships and freighters and troopships. This is what we have done:

Sunk	51
Believed sunk	21
Hit and damaged	159

Those ships were all types from battleships to destroyers, tankers, cargo ships and troop carriers. They were moving and standing still. Some were in harbors, others in narrow channels and still others out in the high seas hundreds of miles from shore, but regardless of where they were our bombers have been able to hit them and sink a large percentage of them.

On land we have dropped millions of pounds of explosives. The results have been devastating. When General Montgomery's troops reached Benghazi they found the harbor and city a mass of ruins and debris. The port was burned out, the docks were destroyed and there were quite a number of ships sunk in the harbor. We dropped about a million and a half pounds of bombs on that place.

Today we have our bombers working in eight combat zones. Each day that passes sees our numbers increase and our striking power building up. Within a few months the Germans, the Italians will be feeling the impact of these hundreds of planes dropping their bombs, not on one or two nights a week but every day and night in the week.

WHEN that time comes we will hit their submarines while being constructed, on their ways, at their bases and out in the wide oceans. We will hit their transportation facilities, their industries, their munitions plants, their airplane and tank factories. Hundreds of thousands of their people will have to move to other localities. They will realize what a true war of today means. Such is the fate that will come to both Germany and to Japan.

That is the kind of missions that you men here today have ahead of you. You must be ready to take your place in the gigantic Air Force Team slowly growing, relentlessly preparing for this tremendous task. It is going to be a tough hard task—not an easy one—but we can and will do it.

Now I'll give you a story to illustrate the kind of *fighting spirit* that you must have.

This combat story is revealed for the first time. Recently, in the Southwest Pacific, A-20 light bombers and B-26 medium bombers attacked Japanese anti-aircraft positions at Soputa. Our planes roared in at an altitude of 75 feet, barely skimming the tree tops. The Jap anti-aircraft guns were hidden in among those trees but that didn't stop our pilots from dropping their parachute bombs with deadly effect. Parachute bombs are terrifying things. They take more time to hit the ground, but all of the fragments are thrown into the air when they burst—few are buried in the ground. Our planes, flying only 75 feet up, were able to drop these bombs with pinpoint accuracy—and get away in good time before they exploded. I am proud to announce that we were the first air force to develop and use this deadly war weapon.

In this raid on Soputa, Jap anti-aircraft guns were destroyed. Ammunition dumps were exploded. In this thrilling action an anti-aircraft shell exploded near one of our A-20s. The burst blew the plane's tail up in the air, and damaged the controls. The pilot, Captain Edward L. Larner, 25, of San Francisco, could not get the plane back on even keel. His plane rammed through the tree tops for over a hundred feet. It collected foliage and brush until the plane looked more like a Christmas tree than an A-20. The nose of the plane and the leading edges of the wings were smashed in, but Captain Larner kept his head and finally pulled up out of the trees. Although there were countless holes in the wings, with broken branches protruding—he kept on flying it—but with difficulty. When the Flight Commander returned *for another run* to machine-gun the Japs, Captain Larner apologized to the Flight C. O. for withdrawing from the formation because, as he said, his *"plane was hard to fly!"* But he flew that plane back to its own airport and landed it safely. That pilot never heard the word quit. With Captain Larner was Sergeant Otha M. Pierce, 32-year-old aerial gunner from Duncan, Oklahoma.

From the Commanding General, Army Air Forces, to Air Marshal A. T. Harris, RAF:

The celebration of this first anniversary of Pearl Harbor is a solemn moment in our lives. The memory that one year ago from this day our belief in the honorable intentions of a portion of the human race was irreparably shattered will constitute a guide for our actions in the future.

The encouraging results already attained from the close alliance between the R.A.F. and our Air Forces will continue to bear bigger and better fruit.

We return to you our kindest greetings and hope that the good fortune attendant on the British courage and skill goes forward with us to the end of time.

Few people today realize what a substantial contribution toward the winning of the war our bombers are making — be they B-17s, B-24s, B-25s, B-26s or light bombers, such as the Douglas A-20.

I would particularly like to speak of our heavy bombers— the B-17 Flying Fortress and the B-24 Liberator. They are our basic *offensive* weapons. The Flying Fortresses and B-24 Liberators are bombing submarine bases, airplane factories, hydro-electric plants, ammunition dumps, food stores, rail centers, naval installations and ships in all corners of the world.

The heavy bomber is blasting the enemy at high altitudes, middle-altitudes, or just

above the house-tops. It is withstanding blistering anti-aircraft fire.

Many different kinds of missions are required of bombers to deal with different kinds of objectives. The retreat of General Rommel's Afrika Korps illustrates this wide *variety* of offensive air action. In the first place, the British were able, with the help of the United States Army Air Forces, to attain and maintain air superiority over Libya and Egypt.

No campaign in this war has been won by a task force not having air superiority.

DURING the past twelve months our research engineering program has been vastly accelerated. I cannot reveal the *most* gratifying developments. However:

(1) Our .50 caliber machine guns have proved themselves to be terrific weapons of aerial destruction. They are one of the outstanding successes of the war, in which Americans can take just pride.

But listen to this: Our highly destructive .50 caliber machine guns will seem like peashooters, compared with the fire-power that we are putting into our newest, big ships.

(2) We have steadily improved our standard models of fighters and bombers.

(3) Some time ago I said that the B-17 and the B-24 were perhaps the last of the "small" bombers. We have new fighters and bombers on the way with tremendously increased speed, fire-power, bomb loads, range, and maneuverability.

Not long ago the Tokyo radio announced that the Japanese public could expect to be raided again before the war was over by American bombers.

For once, I will say to Tokyo, you are right! Yes, we are coming and we hope to make it soon. And when we do come, it will be in large numbers — and we won't stop with one visit. We will return again and again.

(4) Our glider program is proceeding on schedule.

(5) Our newest transports will carry more freight and more men.

(6) Our newest motors, both air-cooled and liquid-cooled, have been vastly stepped up in horsepower.

(7) Photographic reconnaissance on our combat fronts is increasing in effectiveness due to new developments in cameras, and photographic technique. Our pursuit planes can take good pictures at 300 miles an hour, from 30,000 feet, accurately enough to show up individual railroad ties.

The past year has given us what some people call "sound morale". I am not especially fond of the word morale, but if morale is the only word that tells the story, then sound morale is what we've got, and got it in abundance. ☆

COMPRESSIBILITY

(Continued from Page 26)

we start creating compression waves which, like the bow wave on the freighter, require considerable additional energy simply because we affect the air for a greater distance roundabout.

When we start creating these shock waves they eat up energy at a tremendous rate, with the result that more power and more push simply make bigger waves but do not necessarily permit us to move any faster. It might be compared to the soap box politician who workers harder and talks louder but just can't say any more. It isn't the noise and fuss that counts. Actually, an airplane can create enough "fuss" so that it can never be dragged appreciably beyond a certain speed without using an impractically great power.

Airplanes since their inception have been built to take advantage of the characteristics of air when displaced gently, or, from the wind tunnel point of view, when the air flows smoothly over the surface. In the early days there was some thought that a rough surface on the wing gave more "bite" and consequently more lift. We now know, of course, that we get better results with smooth surfaces simply because we *reduce* the disturbance.

To visualize airflow around an airplane or a bullet it seems easier to think of the object standing still and the air flowing around it. As far as a little molecule of air is concerned, it gets the same reaction but it may be difficult at first to visualize the similarity between flow past an object and an object's motion through the air.

Actually, when an airplane wing comes along, the little molecule of air has to jump out of the way, speed up over the top, and come back down in behind the wing. The passage of the wing has, in effect, created a region of lower pressure and the air has to flow in to fill it up.

Again we get back to the old toothbrush. If the little molecule of air has been displaced too far it just can't get in fast enough to stick to the surface, with the result that the molecule gives up and leaves a disturbed region of relatively rarified and turbulent air on the surface of the after portion of the wing as it goes by. We get either a stall or a compressibility burble or a combination of the two, depending on the speed.

It may be confusing to think that an airplane may react the same way in going too fast as it does in going too slow. A stall is simply trying to get too much lift. We increase lift by the amount of displacement of the air and by trying to increase the downward push. At any given speed the little particle of air has to move faster in order to pick up this downward velocity and its ability to accelerate is limited. When it can no longer make the grade we get the condition known as stall, i. e. a breakdown in smooth flow.

At very high speed the little particle of air may not have to move so far, but it has to move faster, with the result that it again has to accelerate rapidly and its ability is again limited. These two factors are always tied together; consequently, any consideration of compressibility is a function not only of speed but also a factor of lift or displacement. This means that critical speeds for wave formation will not always be the same but will depend upon shape and altitude.

There has been a lot of nonsense observed and talked about the fact that the so-called critical speed, namely the speed of sound, will always be a positive physical barrier to the further development of aircraft speeds. One may find any number of theories to prove conclusively that airplanes cannot fly if built beyond a certain size or weight. Yet, flyable airplanes have been built twenty, fifty and one hundred times the weight of these so-called limits, depending upon which limit you choose. We could probably find that each 100 mile per hour milestone had some defender who claimed that it was impossible to go beyond.

By the same token, critical speed is probably more nearly like a wall or obstacle which has to be hurdled but may not necessarily be a hard and fast limit.

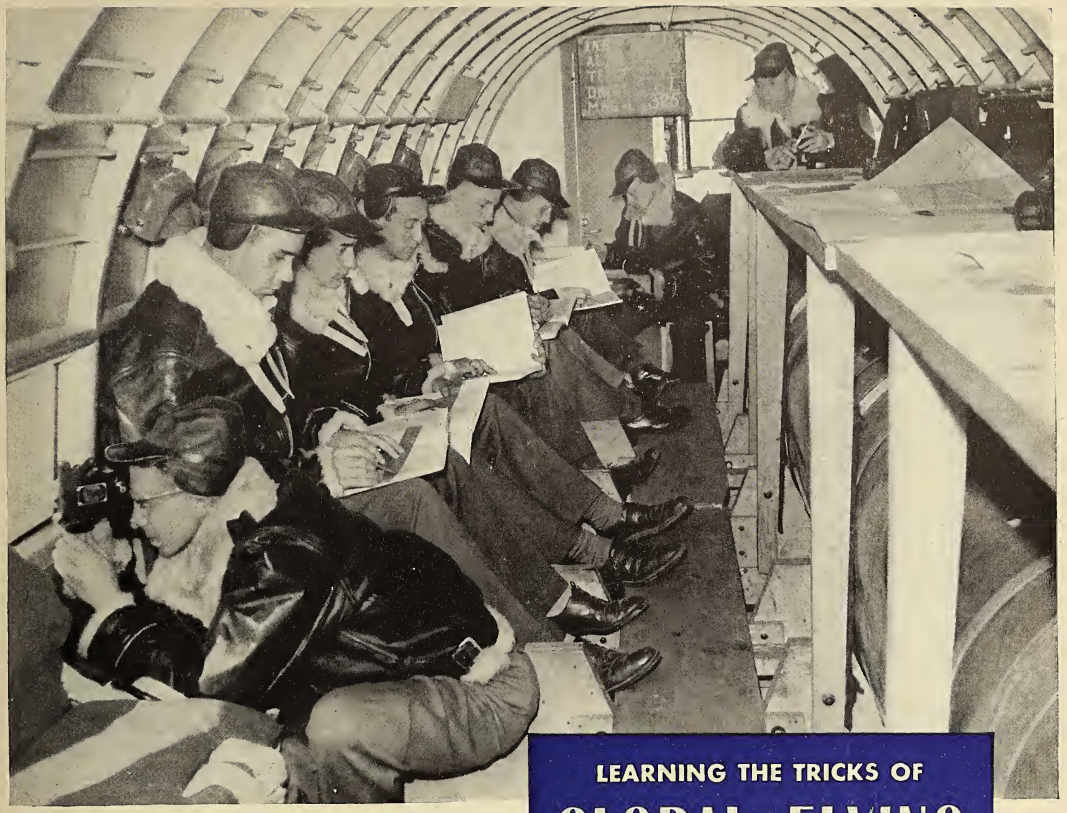
The crack of a bullet as it passes overhead is evidence that it is possible to build objects which can hurtle through the air at "supersonic speeds." One has only to visualize a bullet big enough to house a man to realize that it is conceivable that travel may be accomplished at such speeds. The problems of starting and stopping, and of control, are at the moment relatively unknown, but exploration of the unknown has always been a challenge.

WHO wants to ride a bullet? Literally hundreds of pilots have ridden successfully in projectiles which travel at speed definitely above the speeds of slow bullets and only slightly less than some higher speed projectiles. For instance, a 600 mile per hour dive, which is well within reason, involves a speed of very nearly a thousand feet per second through the air. At high altitudes this speed is definitely above the speed of sound.

It is hard to visualize what it would feel like to ride in a bullet, but at the speeds now reached a number of effects due to compressibility have already been observed. Another article will attempt to describe some of these effects by calling on imagination to describe some of the possibilities which might be encountered when riding a bullet.

We know what the shape of a bullet should be. It usually has a sharp point and the tail is usually blunt. The curvature of the shape and the sharpness of the nose are apparently critical. Perhaps airplane designers will have to study ballistics and trajectories to design airplanes in the future. Perhaps our blunt-nosed, sharp-tailed airplanes should simply swap ends when they cross the threshold of the speed of sound.

Bullets, boats and propellers have been making waves for years; to this knowledge we have added some waves peculiar to airplanes. In a succeeding article some of the design considerations influenced by compressibility will be presented. ☆



Aerial schoolroom for student navigators

LEARNING THE TRICKS OF GLOBAL FLYING

By Herbert H. Ringold

You have to know all the trade secrets when you transport the big planes from here to hell-and-gone and back again

THE plains of Northern Missouri are pancake flat, lack a sizeable body of water and have neither tropic heat nor Arctic cold. But for practical training purposes the 600-mile radius around Rosecrans Field at St. Joseph might be a jungle, desert and ocean all in one.

Rosecrans deals in the trade secrets of global flying. There at the Air Transport Command's Operational Training Unit trainees are taught the ins and outs and ups and downs of flying our biggest ships all over the face of the earth.

In global flying you've got to know all the tricks. You've got to know the right way to come down in an emergency on water, beach, desert and jungle; how best to maneuver a heavily loaded, unarmed plane while under attack from enemy fighters; the precautions to take against sabotage; how to load for maximum range with minimum fuel.

For emergency landings in jungle country, as an example, they recommend coming in with gear up, making full use of flaps to land at minimum speed. They suggest landing nose high into the heaviest possible jungle growth to use it for a cushion.

Over water, you are instructed to land gear up, without flaps, to prevent a diving motion, since the flaps are located below the center of gravity. A B-17 will sink in about 30 seconds so you have to know how to get out in a hurry and inflate your life raft.

For beach landings, you come in gear down and flaps down, exactly as if making a runway landing.

On the desert, come down on your belly; your plane can be jacked up and flown out again. This was proved in Africa when a flight of P-40s, being convoyed by a B-24, got lost in a sandstorm. Twelve planes were in the flight and they all came in gear up. Of the twelve, ten were flown out immediately; the other two were flown out after their props had been straightened. And there wasn't an injury to the entire flight personnel.

That's the kind of instruction the boys at Rosecrans are getting under the direction of Lieutenant Colonel Curtis A. Keen, Commanding Officer; Captain Norman K. Warner, Director of Training; a staff of old commercial air line and Army pilots with thousands of hours of commercial air line and transoceanic flying; navigation and radio officers to whom the stars and waves of Africa, India and Australia are as familiar as their home heavens, and technical research pilots whose practical proof on long range flying procedure adds factors of safety and miles per gallon to the performance of the aircraft these crews are to deliver to the battle fronts of the United Nations.

A flight engineer arrives from Nashville, Tennessee. A radio *(Continued on next page)*

LEARNING THE TRICKS OF GLOBAL FLYING

(Continued from Page 37)

operator has just finished training at nearby Scott Field, Illinois. A navigator comes up from the school at Coral Gables, Florida. A co-pilot recently from four-engine training at Turner Field, Georgia, may be paired with a pilot recently commissioned from commercial air lines (many pilots at Rosecrans are) who may have previously been an operator of a civilian flying school, an old barnstormer or a forced fire patrol pilot. All are reserve officers who maintained their flying efficiency in civilian service, bringing to this emergency plenty of hours in commercial flying plus Army background from original training and reserve officer status.

THESE five men live, learn and fly together in the same ship they will eventually take out to some foreign base. Right off, they are formed into a five-man flight crew, and are drilled in teamwork. If one man can't get along with the rest, he's moved to another crew.

A series of examinations and flight checks are first on the training list to determine what the men already know. Then comes individual instruction.

The flight engineer, for example, is taught the peculiarities of his particular job in long range flying. He learns the specific measures to be taken against sabotage. Check tires for cutting. Watch out for crossed wires and foreign material in the battery cells. Guard against abrasives in the generators. Be sure of the wiring around the fuses. See that there has been no tampering with the solenoids. Make a general check for damage to the electric wiring. Pay careful attention to the fuel system; the introduction of water, chemicals, or any foreign matter will cause a sudden stoppage, and a handful of sugar will mess up the works. The lubricating system must be gone over with a mother's patient care. Straw or rags in the intake scoops may cause a malfunctioning of the carburetor. The transfer system has to be inspected for leaks. From top to bottom, inside and out, the flight engineer learns what he might run up against in foreign territory.

THE radio operator is taught secret codes and ciphers for overseas operation. He practices code until his speed is improved to a point of perfection. He gets so he can recognize a Messerschmitt and a Zero in his dreams. He gets additional training in servicing his radio equipment while in the air, and learns about the different types of radio equipment he may have occasion to use.

The navigator discovers that he is the most important man in the plane while it is making a water crossing. To give him specific training, "The Little Red Schoolhouse of the Air" has been utilized. This is the name given a C-53 which has been rigged up to hold seven or eight student navigators, a radio operator, and an instructor. When the plane starts off on a cross country flight, the navigators go to work exactly as if they were crossing the ocean. They don't get to look at any landmarks, since most of the flights are made at night and they have to bring the ship in on celestial navigation. It is a simulated trans-Atlantic flight and the boys are made to realize that 700 miles out of Natal they won't find a conveniently located church spire to show them the way home.

Following individual instruction, a five man crew is brought together for coordinated training. From now on, this is the same crew that will fly together to any point on the compass. They are taught the approved methods of avoiding ack-ack fire; what to do in case the station they are approaching fails to recognize them; the principle of using corridors for approach; and the necessity for use of proper recognition signals to avoid causing false air raid alarms.

Specific instructions are given concerning proper loading and balance. This is particularly vital to insure the maximum range with the fuel available and to guarantee stability in flight. Information on power control is given to insure maximum range under any conditions at any altitude, including the possibility of one engine failing.

Emergency methods of fuel transfer in actual flight are also taught. One crew on a trans-Atlantic mission found that their fuel tank was losing gas rapidly. Everything indicated that the tank had been punctured by a machine gun bullet. But a fast and accurate check in flight proved that a transfer pump had been turned on accidentally; the fuel from the auxiliary was going in and overflowing. A quick switch and the faulty operating pump was put in proper working order.

A DAY celestial flight is made with no maps and an allowable error of only two miles from the set course. A night celestial flight is not less than 600 miles each way with complete dependence placed upon three star fixes and an allowable error of not more than two miles. A day D/R flight is taken without sun lines, maps, or radio facilities. The Link Trainer is used for Q.D.M. and loop approaches through corridors hemmed in by mountain and barrage balloons. An instrument check on range includes the fade 90-degree system with field approach, but requiring a pull out. Regular cross country flights are an essential part of the training. And this is all in addition to 31½ hours of academic instruction and 17 hours of military training, including Infantry and Physical Drill.

Rosecrans Field was activated early in July of last year. For months the men lived in tents and the Commanding Officer had his headquarters in a trailer. Permanent barracks have probably been built by now, but it won't make much difference. At Rosecrans you practically live in your plane, getting ready for the time when your ship will be your home on any one of the four continents. ☆

Old Sarge Finds Our Mechs Modernized

By

Corp. Larry H. Boeck

MASTER SERGEANT F. G. BULLOCH has been in the Air Forces for 22 years and he knows a sharp guy when he sees one.

Sergeant Bulloch, who is line chief of the 62nd base headquarters and air base squadron engineering department of Sheppard Field, Texas, is convinced that things have changed as far as being a mechanic is concerned.

"Time was," the Sarge explains, "when a mechanic was a jack-of-all trades. He fixed anything that needed fixing on a plane. Today, that's different. The fellows graduating from A. M. school learn to do everything, of course . . . but they also learn a lot more than mechs did when I was going to school and they have to be more alert and studious."

"The mechs today," he points out, "are specialists, which means they're hell on wheels for some special job like props, hydraulics, and the like. This is so because planes have changed a lot. Back 20 years ago, a crate was considered powerful when it had an eight volt electrical system. Most ships today have 32 volts."

"Another thing: the old ships had a horsepower of 150. Today, that's stepped up to a hefty 2,000 horsepower. Those vintage crates didn't have any 100 octane gas, or 92, for that matter. All of it was unleaded."

For the radiators, the Sarge remembers, the boys used plain, ol' alcohol. It looked a lot like the white gasoline now used in gasoline stoves. The resemblance was so great he remembers one mechanic who poured the gasoline into the radiator instead of the alcohol. The boys started to warm the ship up and the gasoline came out of the overflow pipe. Then a blaze started. All of which, says the Sarge, is a little tip to be alert.

To start the ship, the boys used the old hand prop system, since there was no starters, toggie switches or T. O. 02-1-29.

"The biggest change," Sarge Bulloch relates, "is in the way the mechs today work. They really are 'commandos in coveralls.' The boys have to be fighters as well as mechs, and the way they have kept battered crates aloft in the war zones is great testimony to their ingenuity, fighting heart and ability."

"Yes, sir—commandos in coveralls. A wrench or a tommy gun—all the same to the boys."—*Sheppard Field Texacts.*

Forced Landing

(Continued from Page 22)

Avoid snow drifts, broken ice fields and other rough going, unless it is absolutely necessary to cross them. Snow is not deep on ridges as the wind blows them clear. You *must* travel *slowly* and avoid exhaustion.

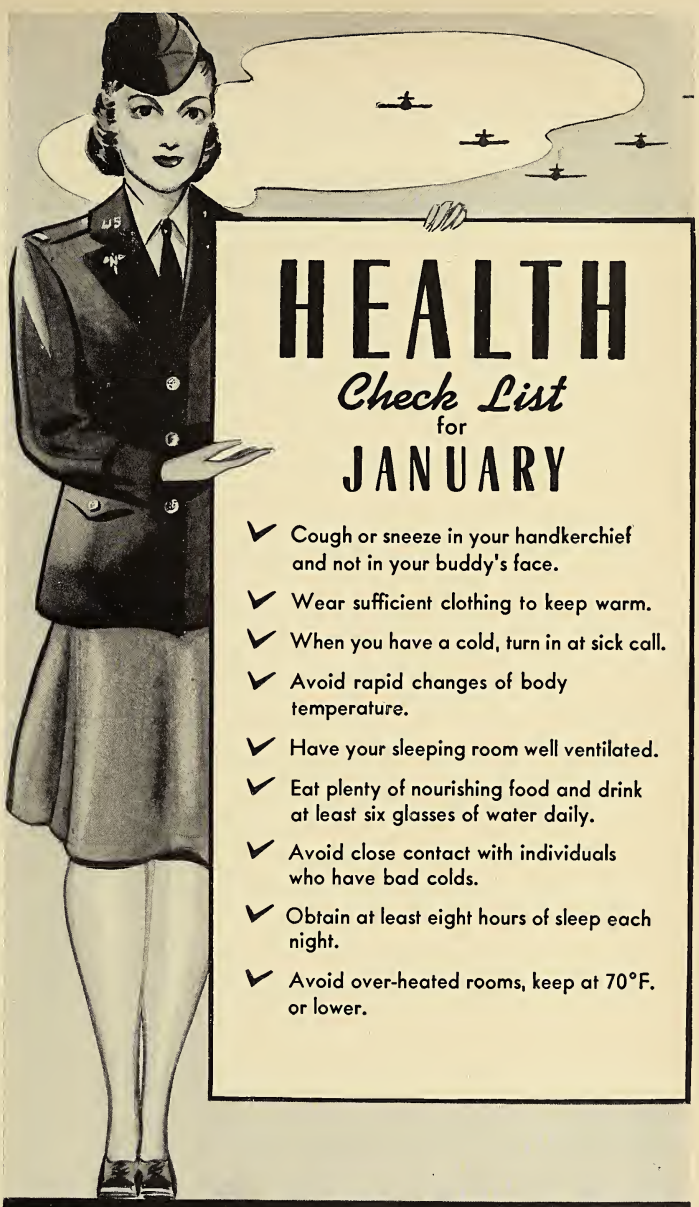
There is abundant water in the Arctic. The only bad result from eating snow is that it chills the mouth and throat and a great deal must be eaten to satisfy thirst. If river or lake ice is available, it can be chopped up and chewed or melted. At sea, last year's ice can be melted for drinking or cooking water. It can be recognized by its bluish appearance, as contrasted to grayish salt ice, and it produces a glare while salt ice is milky in appearance; also, last year's ice has rounded corners and cracks as a result of thaws and rains. During the summer, fresh water is found in the hollows on old ice.

When stopping for the night, get in a lee and make a tent out of your parachute, but be sure that wind-blown snow doesn't cover your camp during the night. A windbreak immediately adjacent to the tent is best. A boulder, cliff, a snow or ice-wall provides protection from the wind. A ten-foot square of silk or canvas makes an excellent tent; three corners are staked down pointing into the wind; the fourth corner is tied to a bush or tree. A small fire in the open end of the tent can be used for cooking and keeps the tent warm. Wood, coal, various mosses, and animal fats and oils may be used to make a fire. Iron pyrite is plentiful in many parts of Alaska and can be used as a flint and steel if matches are not available. The sparks must be caught on dry tinder; moss, grass and weeds can be made into tinder. A burning candle will produce enough heat to make a tent quite comfortable. If pine boughs are available lay them on the ground inside the tent so your clothes and sleeping bag do not get wet. Sleep with feet nearest the fire; they are the parts of the body that are chilled first.

If you have no equipment, you will not necessarily freeze to death. Eskimos have gone for many days in bad blizzards by sitting with their backs to the wind and their arms pulled up out of their sleeves and held close to the body. When the cold would awaken them from time to time, they would get up and move about to get warm again. However, if a person is exhausted when he sits down to sleep, he may not appreciate the warning symptoms of cold, and thus not get up when chilled.

Uninjured men forced down in the Alaskan wilderness, by proper use of their emergency equipment and rations, should be able to exist indefinitely.

Anyone assigned to Alaskan duty will do well to become familiar with Field Manual 31-15, Subject: Operations in Snow and Ice; Field Manual 1-240, Subject: Arctic Manual; Technical Order No. 01-1-67, Subject: Arctic Operation; and Alaskan Air Route Guide published by Air Intelligence. ☆



COMBAT REPORT

(Continued from Page 15)

Of course, every effort was made to lay the dust, but in most cases no black-top was available to cover the strips properly. Sometimes resort was made to the use of molasses—a trick learned in the Philippines, where the surplus of molasses would really hold the dust for a considerable length of time.

In New Guinea the problem was very much the same due to the hilly nature of the ground, except that if our planes ever got off the runway they frequently bogged down in the soft, swampy land. Operational needs often forced the use of these strips before dispersion areas could be built. The inability to effect dispersion immediately in many instances was the cause of the loss of planes from strafing by the enemy.

Most of the operations took place in the northeastern and northwestern parts of Australia. The climate and the type of operations were different from anything we had seen before. Our pilots and our combat and maintenance crews have experienced conditions they little dreamed existed. But, nevertheless, our men of the Air Forces have been masterful in their achievements.

On the northwest side, for example, we had one fighter group of P-40s that was especially successful. Ably led by Colonel Wurtsmith and skillfully managed by subordinate commanders, it established the remarkable record of 64 victories against 16 pilots lost from April 7 to the time of my departure from Australia on August 23. It is felt that credit should be given them for twice that number, as the Japs had to return home over 500 miles of open sea after this Group had jumped them. Many Jap planes were surely lost in the sea due to mechanical failures, such as holes in the oil coolers and leaky radiators, that forced them down some time after breaking off combat. Certainly others were lost through lack of sufficient fuel to return to their base.

For operations off New Guinea, our bombers especially faced many difficult problems. They were usually based on the northeast side of the mainland of Australia. Often they had to fly 1,000 miles before reaching their point of departure for the raid.

If Rabaul was the target, they flew to an airport on New Guinea, refueled, and then headed for the target 550 miles away, first climbing over a 14,000-foot mountain range within the first sixty miles, which forced them many miles off the direct route. This meant a total of 3,200 miles an airplane had to cover to make one raid on Rabaul, approximately eighteen flying hours for the crew. Excessive use of engines, the wear and tear of combat and the effects of dust not only cut down the operational life of our planes but necessitated more frequent rest for the combat crews.

The weather there adds a great deal to the strain of combat. A constant equatorial front hangs in a northwesterly-southeasterly line from New Guinea to the Solomons. It shifts back and forth only about sixty miles during the various seasons. Its weather has a nasty habit of being clear and unlimited one moment, and a solid sheet of rain the next.

Many of the pilots, in order to make their way home with gas still in the tanks, have to force their way through weather of this kind. The buffeting they get takes a lot out of them and their airplanes. Many of their missions had to be abandoned because of this front, and I feel sure that some of the ones that failed to return did so because of extreme meteorological conditions.

This weather, combined with combat, gives the navigator as difficult a job as he has ever experienced. The utmost accuracy on his part is demanded in flying over sea and jungle—and this despite the lack of landmarks, decent maps, navigational and radio aids, and the inability to use celestial navigation because of heavy cloud formation. The fact that he seldom fails is a commentary on the fine training he received at home.

The Fortress really hits hard. To support the Marine landing at Guadalcanal on August 7, Colonel Carmichael personally led his Group over Rabaul. Not only did his Group plaster the Japanese main airfield of Vunakanai, but it shot down forty percent of attacking Zeros in an aerial combat that lasted for an hour and a half.

The B-26 and the B-25 have had a similar record over Lae and Salamaua. In one raid that I recall, the B-26s, without fighter escort, shot down fifty percent of the Japanese who attacked them.

Flying conditions in the Southwest Pacific theater demand the best in equipment and we have the best. But it takes proper maintenance to keep it that way. Here the ground crews are doing a remarkable job. None of us could fly without them. In our April raid on the Philippines from Australian bases, I personally saw how vital they are to flying.

Too much credit for the success of that operation cannot be given to the combat crews who not only faced the dangers encountered throughout the trip to, from, and during the raids, but who helped in most of their own maintenance and rearming once we arrived at secret bases in the Philippines. Their brilliant success, however, depended on the work previously done by the Air Force ground troops in Australia. He who does not pay tribute to the boys who keep him flying isn't much of an airman.

But the good work of our ground crews is generally reflected throughout all of the service. Despite obstacles and incredible hardships, our men are cheerful and eager to get on with the job of winning the war.

They do recognize that they are up against a ruthless enemy—one of the toughest foes we have to face. If he is successful in combat, he has accomplished a divine mission for the Emperor. Should he die, he then goes to one of the great Japanese shrines, where he is rewarded for his efforts with hot Sake wine and geisha girls. We should do everything we can to help him get there. ☆

ROLL OF HONOR

(Continued from Page 17)

AIR MEDAL

LIEUTENANTS: Lawrence W. Hanson, Phillip C. Seveilla. **WARRANT OFFICER:** Herbert G. Spees. **PRIVATES:** John M. Bowsen, Thomas N. Collins, Milton Kalter, Robert W. Murray.

OAK LEAF CLUSTERS

MAJORS: Clarence McPherson*, Weldon H. Smith. **CAPTAINS:** Felix M. Hardison (three Oak Leaf Clusters to Silver Star), Guilford R. Montgomery, David C. Rawls, Elliott Vandevanter, Jr. **LIEUTENANTS:** Melvin McKenzie, Austin Stitt. **STAFF SERGEANT:** Raymond P. Legault.

* Posthumous

CITATION

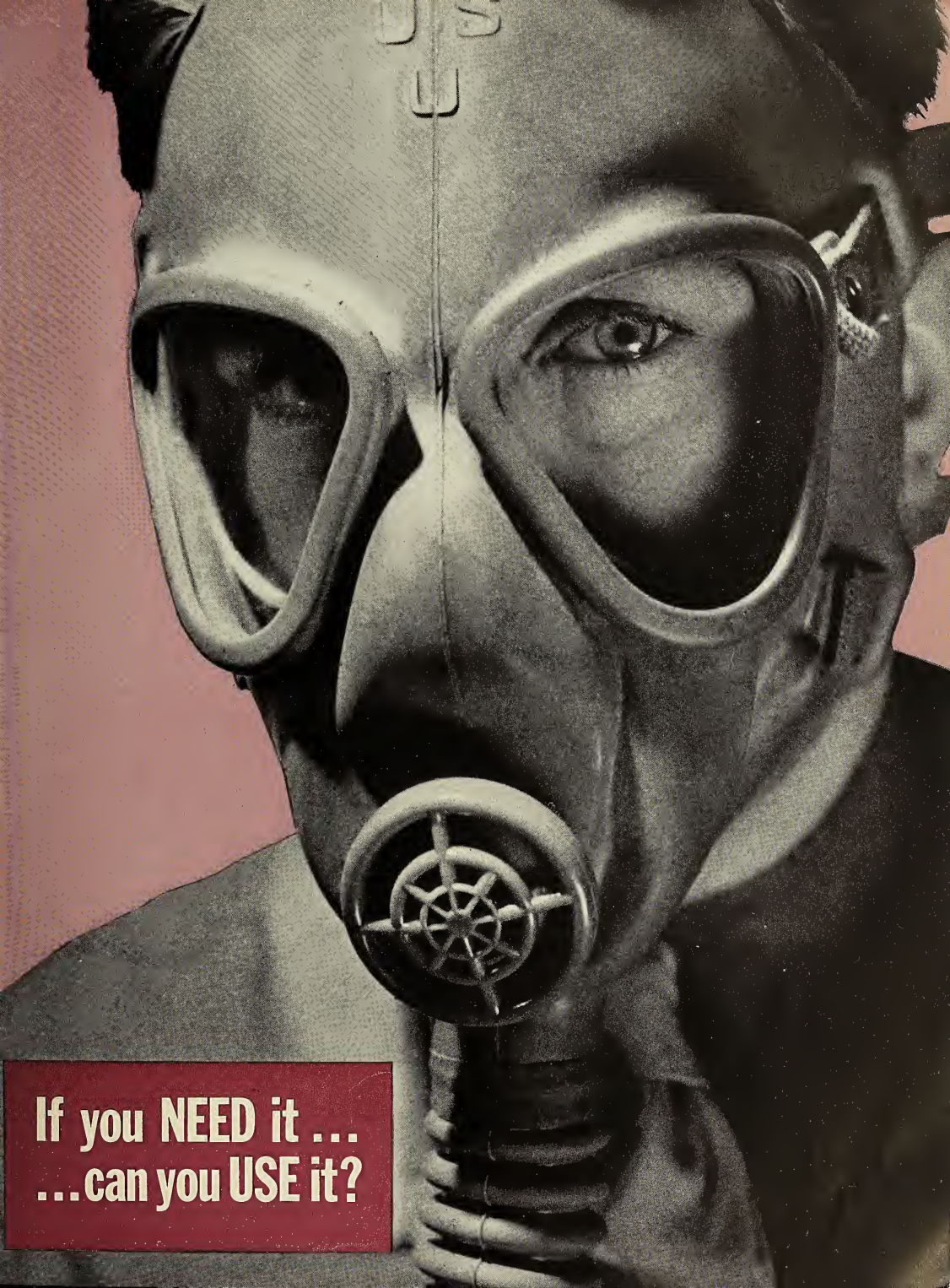
THE SEVENTEENTH PURSUIT SQUADRON (provisional), United States Army Air Forces in the Far East.—As authorized by Executive Order 9075 (Sec. III, Bull. 11, W.D., 1942), a citation in the name of the President of the United States, as public evidence of deserved honor and distinction, is awarded to the following-named unit. The citation reads as follows:

"The 17th Pursuit Squadron (provisional), United States Army Forces in the Far East is cited for outstanding performance of duty in action during the period January 14 to March 1, 1942. In the defense of Java and other South Pacific Islands and in the combined operations that checked the enemy and saved the Allied Fleet at Soerabaja, it repeatedly entered into combat against a numerically superior enemy while escorting A-24 dive bombers. In less than one month, under great difficulties, the 17th Pursuit Squadron shot down 38 enemy airplanes. Its pilots exhibited the greatest bravery and resourcefulness; its ground units, in the face of heavy enemy fire, performed all duties with utter disregard of personal safety. The superior courage and devotion to duty shown by this squadron will always be worthy of emulation."

ANSWERS

To Quiz on Page 10

1. (b) The tail assembly.
2. (d) A bubble octant is used by the celestial navigator to measure the angle of elevation of a celestial body.
3. (c) A British plane.
4. (c) 1903.
5. (c) The details of moving, quartering and provisioning of troops.
6. (b) Status does not belong. (Cirrus, Stratus, and Cumulus are three basic types of cloud forms.)
7. (b) Air speed.
8. (c) Aleutians.
9. (d) Phosgene is a lung irritant used for casualty effect in chemical attack. Has an odor like new mown hay or freshly cut corn.
10. (b) Mid-wing monoplane.
11. (c) 10 inches or less. (Tech. Order No. 03-5E-1.)
12. (c) Near West Point.
13. (a) True.
14. (b) False. (The Air Crew Members Aviation Badge is worn by other members of the crew.)
15. (b) False. A radial engine is an air cooled engine.
16. (b) False. BT stands for Basic Trainer.
17. (b) False. The senior should be on the right when walking and when riding.
18. Combat observers wings.
19. Russia.
20. German Messerschmitt 110. (This ship was captured by the British.)


If you NEED it ...
...can you USE it?


Was it CARELESS talk?
WAS IT YOU?
SINK 2 SHIPS
U-BOAT TOLL
Blaze on Ship
12 Bodies Taken From Train Wreck
THREE TRAINS COLLIDE... DEATH TOLL IS HE
TERRIFIC IMPACT
POWDER BLAST KILLS 35;
200 HURT; HINT SABOTA
Tragedy of the
Killing 12, Ar
10 Injured
Three Killed
Torn by Blast; 20 Hurt
Great Disaster
Three More Full Pages of
HURT IN WRECK
U-Boat Victim
Torpedoed off N. J.
SPY-AID CASE
U-Boat Killed 11
BLAST KILLS 3

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

FEBRUARY 1943

Vol. 26 No. 2

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AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

February Brief

THE PRECISION with which paratroops were delivered at the right spot at the right time during the invasion of North Africa has been given wide praise. General Arnold recently cited that operation as "a credit to one of our newest Air Force organizations, the Troop Carrier Command, and to the parachute battalions," and added: "You will hear more and more of these organizations as we get deeper into this war."

In this month's AIR FORCE, Brigadier General Fred S. Borum, Commanding General of the 1st Troop Carrier Command, explains in an article on Page 8 how the Command functions and what is involved in aerial invasion. He also reports on troop carrier operations in the Texas air maneuvers last fall.

GALOSHES IN AFRICA? Sounds a little strange, but the "desert" war theater right now is featuring mud and cold, and winter clothing—even galoshes. You'll better understand why after reading the article on North African living and fighting conditions, based on the notes of an Air Force officer just returned from that area. It appears on Page 4.

YOU'RE FLYING entirely on instruments at 4,000 feet in a big C-53 transport with a crew of six aboard. Suddenly there is a violent crash as an oncoming commercial airliner hits you. Thirteen feet of your right wing is torn away, along with a portion of the aileron surface. Your ship goes into a steep spiral.

Get out of that one if you can! Captain L. H. Penn, Troop Carrier Command pilot, did. He pulled out of the spiral on instruments, established contact with a nearby airport, and came in for an emergency landing without further damage to his ship and without scratching himself or his crew.

Colonel Sam R. Harris, Director of Air Traffic and Safety, describes that bit of "beautiful flying" in an article on Page 6. He cites it as an example of "alert, clear-headed action and skill" in a discussion on the need for reducing pilot error as an accident cause in the Air Forces.

MAJOR CARROLL W. MCCOLPIN, 28-year-old fighter pilot, joined the Air Forces last September after 22 months of steady fighting over Europe, first with the R.A.F. and then with Eagle Squadrons. In fact, he is a former member of all three Eagle Squadrons, a distinction no one else enjoys, and commanded the Third Eagles for several months.

He is tied for top score in the Eagles with a total of eight enemy aircraft destroyed, one probably and an undetermined number damaged. In addition, he is credited with destroying two trains, two boats and three lorries.

Major McColpin, from March, 1941, through November, 1942, accumulated a total of 253 operational hours in 184 different sorties, which is a lot of combat time in fighter aircraft. While at Headquarters recently for intelligence interviews, Major McColpin was asked to do a first person account of his combat experiences, and he complied with the article which appears on Page 7 of this issue.

SEVERAL months ago, in the old Air Forces News Letter, predecessor to AIR FORCE, we published an organization chart of the Army Air Forces. It turned out to be one of the most popular features carried by the News Letter.

The Air Forces have undergone a number of changes since then, and, for the moment at least, the chart seems to have stabilized. (We cross our fingers with that one, having seen dozens of organization charts become obsolete at a moment's notice under pressure of the expanding Air Forces.) At any rate, we thought it time to present an up-to-date chart for AIR FORCE readers. It appears on the inside back cover of this issue, and is correct as of January 15.

Going a step further, we asked Colonel Byron E. Gates, Assistant Chief of the Air Staff, Management Control, the top man in such matters, to review the background of Army Air Forces' organization and discuss the present structure in some detail. The article by Colonel Gates appears on Page 13.

THE COMMANDING OFFICER of a bombardment unit in the Aleutians, following a B-26 mission over Jap-held Kiska Island, conducted a friendly contest, among crews which participated, for the best written narrative covering that action. The prize-winner was Technical Sergeant L. O. Gardner, a bombardier. We are happy to print his article on Page 17 for all Air Forces personnel to read, and we invite other combat units to follow suit with similar writing contests.

THE FRONT COVER picture this month shows armament men servicing the 50-caliber guns of a P-47 fighter.

AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

FORMERLY THE AIR FORCES NEWS LETTER

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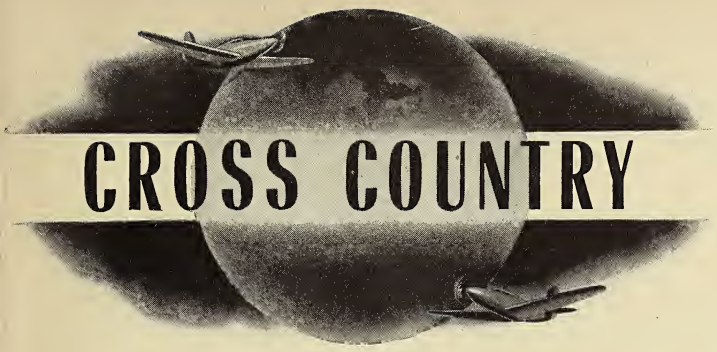


CROSS COUNTRY

A new flight control system and other developments of the month within the Army Air Forces.

THREE or four months from now pilots of the Army Air Forces will have a new kind of service on cross country flights.

Airways Traffic Control centers and communication facilities will maintain contact with all Army airplanes on such flights. They will give pilots complete information on weather changes and on hazards and other conditions which may arise to make continuation of particular flights difficult.

Coupled with this move will be a general standardization of clearance procedures on cross country flights throughout the Air Forces. Officers signing clearances will be required to *know* that the airplane and pilot are thoroughly prepared for the flight to be made. They will be responsible for seeing to it that all information necessary for successful completion of the flight is available and used.

This announcement is based on information provided by the new Directorate of Air Traffic and Safety.

First official notice of these changes was contained in A. A. F. Regulation 20-1D issued early in January. Under its provisions Colonel Sam R. Harris, Jr., the former Director of Flying Safety, became the Director of Air Traffic and Safety, supervising and coordinating the activities of a Director of Flight Control (Lieutenant Colonel George C. Price), a Director of Flying Safety (Lieutenant Colonel James T. Peyton) and a Director of Safety Education (Major Robert L. Steinle).

Flying Safety and Safety Education are activities which had been carried on by the old directorate for some time. Flight Control is a new element.

The new flight control agency is now in process of organization. It will formulate the rules and regulations under which all clearances for cross country flights will be given. It will set up the procedures to be followed, and through an organization of Regional Flight Control officers stationed at each of the 23 Airways Traffic Control centers will see that control tower and flight clearance personnel understand and are enforcing all regulations and procedures.

These Regional Officers will supervise the system of providing information to pilots as they check into specified stations en route. When the situation warrants, these officers will instruct them to land at the nearest airport, proceed to an alternate airport, or possibly return to their point of starting.

While the change represents an extension of centralized control over flying activities, it will affect only cross country flights, including ferrying and cargo flights. Airline operations will not be affected.

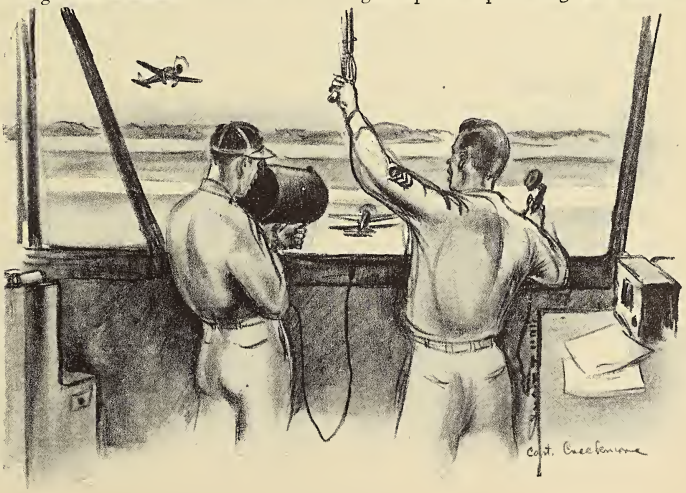
Control tower and flight clearing personnel will be supervised only to the extent of central direction of their procedures and rules for giving cross country clearances, and inspections of their performance. The Directorate will be an allocating agency more than a restricting agency.

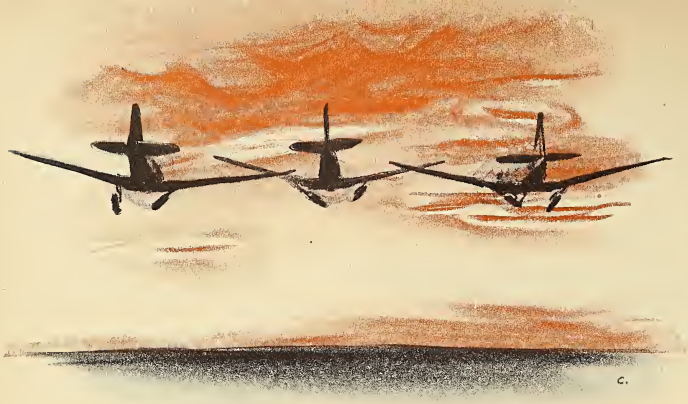
Variations in the amount of control to be exercised in the case of individual pilots will be permitted. A system is being devised whereby pilots with many years of experience will be practically unlimited in their activities. Younger, inexperienced pilots will get more assistance.

For the average pilot, the new flight control will mean that when he gets his clearance he will know definitely that his airplane is ready and equipped for the flight he must make. There will be no guesswork about the routes he is to follow. It will mean that someone else shares with him the responsibility for knowing every condition that he will encounter—fields along his route and every other feature.

When he leaves the operations office he will be informed of the routine procedure of checking with control towers, taxiing, take-off, and traffic patterns to be followed at airports proposed to be utilized on his route. More important, he will know that every other pilot is following the same procedure as he. Flight control will also endeavor to keep him informed of unusual conditions along his route.

The basis for flight control may be found in the accident records and recommendations from the field. It would have prevented an accident such as the one recently involving a B-25, cleared on a cross country flight with a stop schedule en route for gasoline. The flight was at night and the pilot checked over a radio range on his way to a scheduled gas stop. After proceeding about half way





to this stop, he encountered bad weather and turned back to his last check point. But he ran out of gas and cracked up a few minutes after he turned around. The flight was a potential accident the moment it was cleared. Under flight control, the pilot's gasoline supply over the check point would have been known and thus the accident avoided.

A recent flight of B-26s was cleared for a night flight. They arrived at their destination to find that no field lighting or other night flying facilities were available at that field. The first ship landed about the middle of the field or beyond and ran through the fence, ending up on the railroad right-of-way. The second turned around and headed back to its starting point. The third dragged in too low and clipped the tops of several trees, but fortunately was able to land without killing anyone. Proper technical control of operations offices would have prevented this flight being cleared to a field which did not have the necessary facilities.

Another pilot recently cleared a B-24 on a cross country flight. He arrived after dark and on his down-wind approach, just after passing the point where it would have been possible to glide into the field, he ran out of gas. He had about three hours' gas when he took off. He apparently thought he had eight or ten hours. Flight control will require that every airplane cleared has enough gasoline for the flight as planned, plus enough to get to an alternate airport, plus at least forty-five minutes.

While designed primarily as a safety measure for cross country training operations within the continental United States, flight control is also a school for combat. England, like the United States, started the war on a basis of every man for himself. Bitter experience taught the need for standard control and England has it today. Modern combat is impossible without it.

Flight control is a major step in the evolution of the Army Air Forces. Its benefits must be measured in the *safe* completion of *more* Army Flights and thus in more pilots—better trained—for combat.

COLONEL BYNUM walked briskly into one of the barracks at the Harlingen Aerial Gunnery School the other day.

Not a man jumped to attention. They all lounged about writing letters, chewing the fat—and sleeping. Colonel Bynum stopped in front of a private who sat smacking his lips over a hunk of fudge from home.

The private looked up disinterestedly. "Hello, Colonel, old boy," he said. "Sit down before you fall down, and have yourself a piece of chocolate."

Colonel Bynum sighed, reached for the fudge and stretched out on a nearby bunk.

Private Colonel N. Bynum is a gunnery student at Harlingen who will graduate soon with wings and a Gunner Sergeant's rating.

AN Information Center has been established by the Air Forces at Eglin Field, Florida, to collect and prepare for dissemination data on the Arctic, desert and tropics as it applies to the specialized operation and care of all Air Force equipment, climate, living and food conditions, ethnological conditions, soil, coastal and interior terrain, water supply, and health and disease prevention.

The new unit will gather and interpret all information now available on conditions in Arctic, desert and tropics, as well as information sent in by military personnel already in those areas. To this will be added information gathered from experiments of the Center.

Requests for information may be sent to the Arctic, Desert and Tropic Information Center from personnel in this country or on foreign assignment, and from other branches of the armed services as well as from the Air Forces. An attempt will be made to answer all requests, *no matter how small*.

Under the command of Lieutenant Colonel H. O. Russel, Headquarters, Eglin Field, Florida, the Center will include specialists such as geologists, physicians and minerologists, most of whom will be commissioned, and men who have lived in the areas. Personnel from the Center will accompany troops overseas for observation purposes.

The information gathered will be disseminated by answering specific inquiries, by publication of special pamphlets, and through AIR FORCE.

THE Air Surgeon's Office reports that the drinking of fluids before flights to altitudes exceeding 10,000 feet, as well as during such flights, should be greatly restricted. In meals eaten shortly before or during flight to high altitudes, the Office adds, the following foods should be avoided:

Carbonated beverages; all fried foods or food with crusted surfaces; fat meats such as pork or other foods mixed with fat; fresh bread, rolls or cake; navy beans, dried beans, peas and lentils; nuts; raw vegetables, especially onions, cabbage and turnips; dried and raw fruits, except strained orange juice, grapefruit juice and bananas.

WE HAVE read the photostatic copy of a letter from a sergeant in a bombardment squadron on the North African front to an employee of the Glenn L. Martin Aircraft plant, manufacturers of the B-26 for the Air Forces, and of several planes for the Navy and for the British.

Writes the sergeant: "This far away I have heard your factory was shut down. I really hope not and do not believe it."

We don't know where such a rumor started, or if it has spread along the war front to any degree, but we know rumors to be dangerous things and know them to be one weapon of Axis propaganda.

To the sergeant in Africa and to all within eyeshot we are happy to report that the Martin Company hasn't shut down for a minute, and that aircraft and accessory plants throughout the nation are working night and day as never before.

Just for good measure, we quote from a report made recently by Lieutenant General Harry H. Arnold: "We are building overwhelming air power—on schedule. Our monthly airplane production is over 4,000. Our great expansion program now under way will double that output. In 1940 we had in our airframe and accessory plants about 233,000 man employees. Today we have 1,500,000. That explains the tremendous step-up in output of planes and engines."

BASE OPERATIONS at the Air Depot Training Station, New Orleans (Louisiana) Army Air Base, reports several parachutes missing from that office and asks AIR FORCE to request that organizations inventory parachutes at their stations. Should any of the missing chutes be found they are to be returned to Base Operations at the New Orleans station. The chute numbers are: 41-19432, 41-19436, 42-65399, 42-65400, 42-65401, 42-65404, 42-65405, 42-65406, 42-65408, 42-65412 and 65-413.

The Navigation School, Mather Field, California, asks that all Air Force officers

be informed that a Navigation Information Service has been established at that school to which officers may send directly any questions concerning navigation technique, procedures, etc. The Service has grown out of frequent contacts between instructors and their former students concerning navigation problems. Answers to questions will be prepared and forwarded promptly, and all classified material will be properly safeguarded. It is also requested that navigators throughout the Air Forces send to the Service accounts of their experiences which may be of interest to instructors and students at the school. Through the Service, the school believes that considerable help may be given to navigators in the Air Forces and at the same time help the school obtain direct knowledge of problems the navigators are encountering soon after graduation. Thus, steps can be taken immediately at the school to avoid many of these difficulties for present and future students.

These two requests to AIR FORCE lead us to believe that other Air Force units might like to use the service journal in much the same manner. That's exactly what we're here for. By circulating to all personnel, we offer a consistent medium for the exchange between organizations and individuals of requests for information, announcements, "want ads" (at no cost, thank you) such as that for missing parachutes, and the like. In fact, send in enough material and we'll set up a section of the magazine just for that purpose, not unlike the "want ad" section of a newspaper. With the Air Forces growing as it is and spreading out all over the world, we suggest that such a section might serve a very useful purpose. Keep your material as brief as possible, accompany it with the signature of an organization or individual, and we'll try to print everything you send in.

THE Directorate of Communications suggests that the following points might well be put in the form of a posted notice where dispatches are written or received at the code room, or might be displayed on the desk tops of message writers:

1. Use radio only for messages that cannot be sent by other means.
2. Avoid stereotyped *beginnings* and *endings*.
3. Condense wording as much as possible without ambiguity.
4. Incorporate addressee and originator names in the text.
5. Avoid repetition of words or phrases; use synonyms.
6. Ask the cryptographic officer to assist in paraphrasing; initial approved text.
7. Write numerals where accuracy must be assured (each digit or primary number as one word). Example: Write "24 men" as TWO FOUR MEN, *not* TWENTY FOUR MEN.
8. Use the phonetic alphabet (p. 56 FM 24-10) for difficult expressions with letters as well as numerals.

FOR what it's worth, we offer an unofficial report from the Middle East that Germany's Heinkel 111 bomber, with full crew and equipment, can haul exactly 6,400 cans of beer. That contribution to the science of logistics was furnished by Allied airmen who recently captured a Heinkel. Exactly how much captured German beer Allied airmen can carry is a matter of speculation, and enviable speculation, too.

EXCEPTION has been taken to a sentence in the article "Single Engine Operation" by Lieut. Colonel J. B. Duckworth, Columbus Flying School, which appeared on page 14 of the December issue of AIR FORCE. The sentence read: "The ship can be banked steeply into the dead engine and be as solidly controlled as though both were in use." (This discussion involved the necessity for adequate airspeed when flying a twin-engine plane and one engine fails.)

In explanation, the sentence was contingent upon that immediately preceding, which stated: "If a rate of 30 or 40 miles per hour over the minimum single engine operating speed is maintained, no loss of control can result." The meaning: that if adequate airspeed is maintained, the ship could *even* be banked steeply into the dead engine, etc.

Considered by itself, the sentence objected to might indicate that turning into the dead engine in single-engine operation of multi-engine aircraft was recommended. This was certainly not the case. In such operation, whenever possible, the pilot should turn toward the good engine and keep the dead engine up, never down.

FOR maximum effectiveness, AIR FORCE must circulate throughout the Air Forces, spread around the world. If the ratio of distribution in this country is not maintained in ensuing months, you will understand that it is because we are making every effort to keep pace with the movements overseas and get AIR FORCE in the hands of the boys on foreign duty—even to the remotest island outpost. Whatever the changes involved, there will be plenty of magazines distributed monthly for all to read. This will depend, to a great extent, on your seeing to it that AIR FORCE is spread around. Letters keep coming in asking that names be placed on the mailing list. We repeat, there is no mailing list. Our only method of circulation is through bulk shipment. We depend on message centers for equitable distribution at individual fields. And, we depend on you to keep AIR FORCE moving.—THE EDITOR.

From Numbers to Names

Below is a listing of names (by the numbers) accorded official recognition by the Army and Navy as popular designations for American aircraft. For official use within the Army Air Forces, numerical designations will be retained. (Navy symbols are shown in parentheses):

HEAVY BOMBERS

B-17	Flying Fortress
B-24 *(PB4Y)*	Liberator

MEDIUM BOMBERS

B-18	Bolo
B-23	Dragon
B-25 *(PBJ)*	Mitchell
B-26	Marauder
B-34 *(PV)*	Ventura

LIGHT BOMBERS

A-20 *(BD)*	Havoc (Attack)
A-24 *(SBD)*	Dauntless (Dive)
A-25 *(SB2C)*	Helldiver (Dive)
A-29 *(PBO)*	Hudson (Patrol)
A-34 *(SB2A)*	Buccaneer (Dive)
A-35 *(SB2U)*	Vengeance (Dive)
(TBD)	Vindicator (Dive)
(TBF)	Devastator (Torpedo)
	Avenger (Torpedo)

PATROL BOMBERS *(Flying Boats)*

OA-10 *(PBY)*	Catalina
(PB2Y)	Coronado
(PBM)	Mariner

FIGHTERS

P-38	Lightning
P-39	Airacobra
P-40	Warhawk
P-43	Lancer
P-47	Thunderbolt
P-51	Mustang
(F2A)	Buffalo
(F4F)	Wildcat
(F4U)	Corsair

SCOUTING OBSERVATION

(SO3C)	Seagull
(OS2U)	Kingfisher

TRANSPORTS

C-43 *(GB)*	Traveler
C-45A *(JRB)*	Voyager
C-46 *(R5C)*	Commando
C-47	Skytrain
C-53 *(R4D)*	Skytrooper
C-54 *(R5D)*	Skymaster
C-56 *(R5O)*	Lodestar
C-61 *(GK)*	Forwarder
C-69	Constellation
C-76	Caravan
C-87	Liberator Express
(JR2S)	Excalibur

TRAINERS

PT-13 & 17 *(N2S1 & 3)*	Caydet
PT-19 & 23 *(N2T)*	Cornell Tutor
PT-22 *(NR)*	Recruit
BT-13 & 15 *(SNV)*	Valiant
AT-6 *(SNJ)*	Texan
(SNC)	Falcon
AT-7 *(SNB2)*	Navigator
AT-8 & 17	Bobcat
AT-10	Wichita
AT-11 *(SNB1)*	Kansas
AT-13 & 14	Yankee-Doodle
AT-15	Crewmaker
AT-19	Reliant

LIAISON

L-1	Vigilant
L-2	Taylorcraft Grasshopper
L-3-C	Aeronca Grasshopper
L-4-B *(ME)*	Piper Grasshopper
L-5	Sentinel

NOTES from North Africa

North African bombing pattern.

Sidelights from an airman's report on living and fighting conditions in the desert theater of operations.

Mud and more mud. From Casablanca to the front is almost 700 miles and the road network—both motor and rail—is none too good. You are forever being impressed by the distance from one point to another, probably because there is nothing in between but—mud.

In America you can lead a not too sheltered life and in ten years not get stuck in the mud. In North Africa ten minutes is your limit. Everything gets stuck—trucks, planes, feet. Half the operational difficulties of the area can be traced to mud.

Eating and sleeping. There is no answer to cover everyone. Plane crews sleep in their planes, ground crews sleep in tents at oases, in hotels, barracks, anywhere. You eat American rations as far east as Algiers, from there on, British. With the British you drink hot tea and wine. Water isn't always safe. British rations aren't bad; there's sure to be some kind of meat stew.

In the towns and cities—such as Algiers—the Air Force has taken over hotels. Some of them are fine, most not bad. The service is fair; occasionally there is hot water. When the word gets around that the taps are running warm, everybody dashes for the soap and towels. It is not unusual to see a colonel—who has an intelligence system in good working order—drop everything and run for home to get his first bath in a week.

There is nothing to complain of so far as the hotel food is concerned. You get a yen for a piece of red meat occasionally, and green vegetables are scarce, but you get fed.

Breakfast costs thirty francs, lunch forty. A franc is worth 1¼ cents. You change your money into francs very easily, but American Export dollars are good anywhere. These are regular U. S. bills with a yellow seal stamped on them, to the right of the portrait.

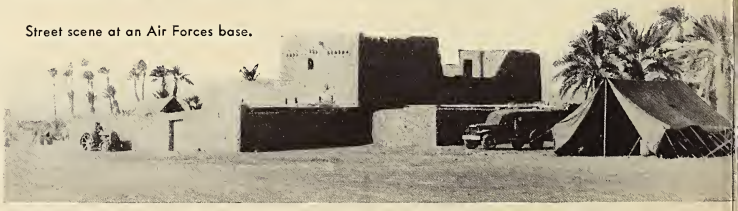
The Fighters. The P-38s have come into their own in North Africa. They do everything. They are used on air defense patrols of Allied strong points, over areas of concentrations, for ground strafing against troop columns and armored equipment, for minimum altitude attacks against surface vessels, and for escorting heavy and medium bombers on missions.

You can hardly find an assignment which P-38s cannot carry out. They escort our bombers 500 miles out and in—as far as the bombers go. They can carry two big bombs and drop them where they do the most good. They are also used for photographic reconnaissance and as weather ships.

The fighter pilots have tough work. Day after day they fly escort duty at 30,000 feet, using oxygen all the time, hour after hour. But they are sold on their ships.

The commanding officer of a heavy bombardment group in the North African theater said he would stake his tactical reputation on the fact that the P-38 is the greatest fighter ever built. "Other fighters are better at certain things, but the P-38 is the best all around ship," he said.

Money means nothing—in the back country. There is the story of the Air Force corporal who wanted to buy some tangerines. He had the dough, and was willing to pay whatever was asked. But the natives would have none of his money. They kept pointing to his shirt and his pants. He caught on, of course, and went back to his tent to see what he could dig up. His supply of clothes was no more than adequate, and he knew everything he owned was precious. Finally he decided to part with his barracks bag. He brought it out. The



Street scene at an Air Forces base.

natives eyed it for a long time, fingered it, and then handed it back. It meant nothing to them. Then the corporal took his knife, cut a couple of holes in the bottom of the bag, slipped a native's legs through, pulled the bag up and tied it tight around the chest. The native was delighted.

The corporal got four bushels of tangerines.

Everybody eats tangerines all the time. You carry them in your pockets and bags and keep them in your room. In the cargo planes there is always a crate open for anyone to dip into.

The Bombers are doing a great job. Morale is excellent among the crews. The fact that the crews were trained in England on combat missions accounts for the smoothness of operations.

The crews on both the light and medium bombers are developing a much more efficient degree of crew coordination. There seems now a strong possibility that crews will be returned here intact—with the same plane they flew in the wars—to instruct.

The Germans aren't taking anything lying down. Their defenses are excellent; plenty of ack-ack gets up to high altitudes. They're throwing a lot of 88 mm stuff at us. But nothing is interfering with our accuracy.

One fortress came home with an 88 mm hole in a wing between the motors. It was a clean hole—the shell had gone through and exploded above—and if you looked carefully you could see the shell rifling on the metal of the wing.

It has become general practice for crews in medium bombers to wear helmets and big goggles, so that if the windshield is shattered by flak or anything else they will not get hit by flying glass.

Of all the legends and cracks and mottos that are painted on planes the best seemed to be this: Over the rear gunner's compartment in a B-17 was a picture of a pair of dice, with a seven showing. And these words, "Shoot. You're faded."

An incident occurred one day at a heavy bomber field which scared the boys a little. A Heinkel heavy bomber apparently got lost, and after circling the field, came in, made a normal approach up wind and landed. The ship, of course, was immediately taken over and the pilot was a very surprised fellow to find that he wasn't in German territory. What scared the boys was that all the enemy's maneuvers hadn't aroused any suspicion.

Flying low over the veldt, a young lieutenant-colonel, from the nose of a B-17, had his eyes wide open at a collection of zoo animals galloping under him—giraffes, zebras, deer, etc. Finally he spotted a buffalo, African variety, and could no longer resist. He let loose with a burst from his nose gun. The buffalo took off.

A general was sitting in the plane, soberly watching what had been going on. After the burst he nodded slowly and spoke

These are the notes of an Air Forces officer just back from an inspection tour with the Twelfth Air Force in North Africa.

to the hunter. "Colonel," he said, "the buffalo is a powerful animal. But the 17 is a good ship. I think you have about an even chance against him."

The cargo planes. Those boys of the Troop Carrier Command are doing a hell of a fine job. They are doing all the air transport in the area, moving, with their C-47s and C-53s, everything that gets moved—equipment, supplies, personnel. They fly—escorted by fighters—from Casablanca right up to the front line airdromes.

They can never rest. They must fly continually under all kinds of handicaps, in and out of small, bad fields. Nevertheless, they show a minimum of accidents and maintain their planes excellently under hard field conditions.

Example: For the Airborne Engineers the cargo boys carried personnel and equipment from Casablanca to a small field far in the interior. This was within a short distance of a drome which it was hoped could be used for heavy bombers. The Engineers—with their miniature bulldozers and their scrapers, jeeps, rollers and graders—put the field in shape so that a B-17 landed *four days later*. The cargo planes got the bombers there.

Unloading emergency rations from a C-47.

Weather, not a climate, that's North Africa. It's good for a week, then bad for a week, which means that you fight hard for a week, then take it easy for a week. Of course, you don't really take it easy, you have no time off. You eat and sleep with the planes, and very often repair them as well.

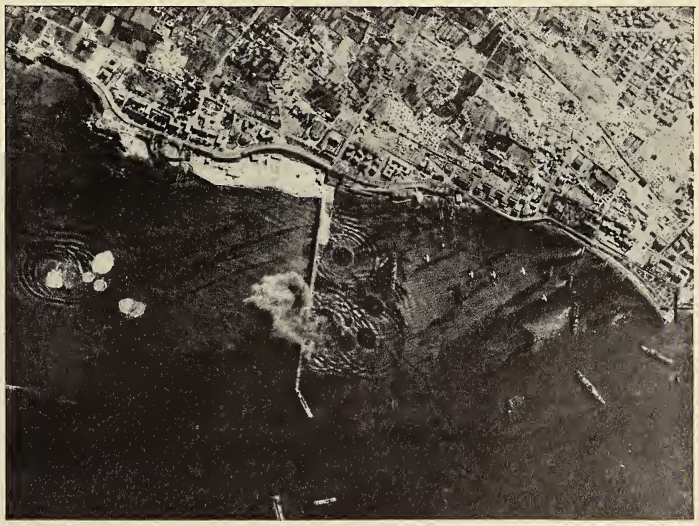
It's cold. Algeria is in the same latitude as North Carolina but without benefit of the Gulf Stream. If you're moving into the area take winter uniforms—and a bedding roll. Take all the uniforms you are likely to need, for when a blouse wears out, you will have to keep on wearing it. Shoes are a big problem. Thin soles are no good at all; the thicker the soles the better. Galoshes will help.

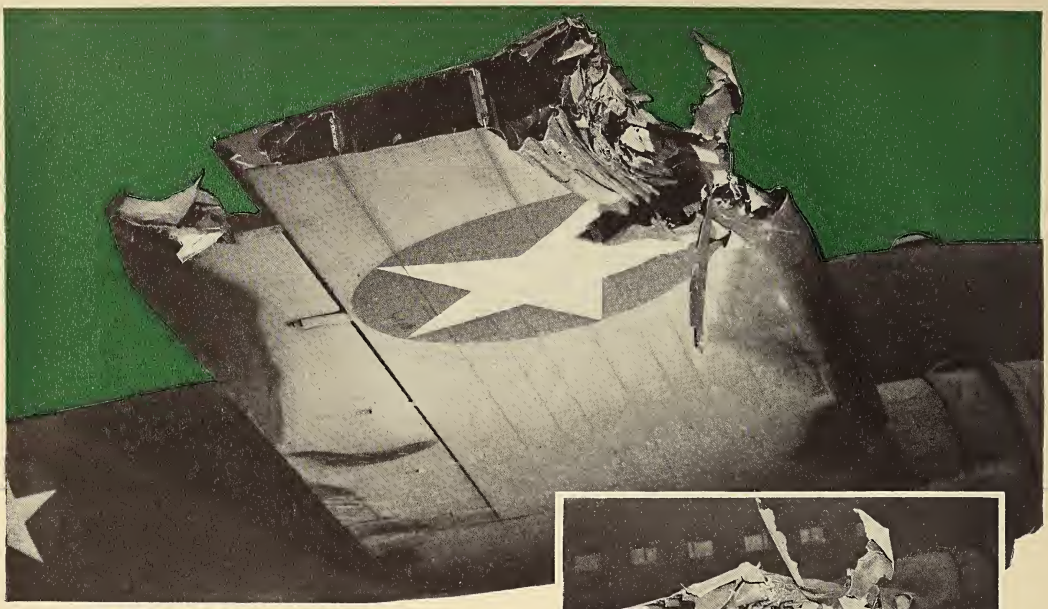
The Arab is a quiet type. However, if you make an effort he will respond, and he seems pleased to talk. The Arabs have finally got the idea that we are temporary visitors and mean them no harm. On the whole, relations with the French and the natives are satisfactory. There is very little trouble.

The standard horror story of what the natives did to a couple of the boys who made passes at their women has been thoroughly spread around, so all is quiet on that front. And in any case, the native women don't bear what you would call a striking resemblance to Hedy Lamarr.

Getting home doesn't take long. You can leave Africa one day and be in Washington the next. Good flying—7200 miles in 44 hours, or 164 miles an hour, including three stops. ☆

Tripoli Harbor during a daylight raid by B-24s.

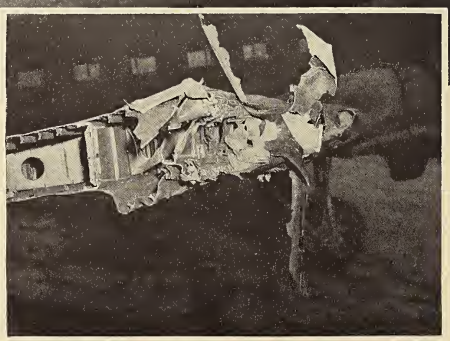




KEEP ALERT AND KEEP ALIVE

By Colonel Sam R. Harris

Director of Air Traffic and Safety



With thirteen feet of wing missing, this ship landed safely

En route to Wichita from Stout Field in a C-53, Captain L. H. Penn of a troop carrier squadron was about five miles from Kansas City at 4,000 feet and entirely on instruments when a violent crash threw his ship into a steep spiral. He knew something had hit him but he didn't know what. The crew got orders to prepare to jump.

Straight and level flight with a perfect airplane is one thing. Pulling a damaged ship out of a spiral on instruments is another. But it worked. The crew of six men didn't jump.

In less than one minute, Captain Penn had established contact with the Kansas City radio. He asked for weather at the airport and warned that he was coming in for an emergency landing. Other ships in the air nearby were sent away from the immediate vicinity and a commercial airliner ready to take off was held on the ground.

Coming out of the overcast at 1,500 feet, Captain Penn found himself north of the airport. In order to avoid a longer turn to the left, he turned the ship to the right despite a damaged right wing. Wheels down and under control, the ship landed safely. Once on the ground, Captain Penn discovered that he had collided with a commercial airliner which crashed in a field a short distance away, all of its occupants escaping injury.

Thirteen feet of Captain Penn's right wing had been torn away, along with a portion of the aileron surface.

This was a beautiful job of flying. Those moments immediately following the crash were probably the busiest that Captain Penn has ever known, but he moved from one job to the next and refused to get panicky.

There are more planes over the United States today than ever before. Because more of them are equipped for it and more men have been trained to do it, there is bound to be more flying in "instrument weather." This means greater exposure to collision accidents.

Obviously, it is impossible to describe in advance exactly what techniques should be used in the event of collisions. In fact, in 999 cases out of 1,000 the thing to do is jump.

The best treatment for these accidents, like all others, is to prevent them from happening. Standardized control throughout the air forces is one long step in that direction. As for the pilot, prevention requires rigid adherence to flight plans—especially to assigned altitudes. By rigid adherence is meant staying within a plus or minus 50 feet of the assigned altitude *all the time.* It can be done by any normal pilot who is on his toes and doing a real job of flying.

Rigid adherence to flight plans also means instrument flying—even under contact flight rules. Modern operational equipment has outgrown the seat of anybody's pants. Your instruments are geared to your equipment. The seat of your pants is not.

Pilot error is still by far the greatest cause of accidents in the Army Air Forces. Alert, clear-headed action and skill such as that demonstrated by Captain Penn will reduce that percentage and with it the list of needless casualties in men and equipment this side of actual combat. ☆

A Jump Ahead of the Jerry

By Major Carroll W. McColpin

U. S. Army Air Forces

Personal experiences of an American fighter pilot during 250 operational hours with the R.A.F. over Europe.

WE knew long before we reached Britain on that crossing back in January, 1941, that things were going to be plenty hot in the months to come.

There were thirteen of us in the first group lined up by a New York committee to go over and give the R.A.F. a hand. Great Britain already had been blitzed from hell to breakfast and the shows over there were still hot and heavy.

We thought we had a fairly good idea of what was coming but we were undershooting.

Of the thirteen, only two of us are still pitching. One of the boys is an instructor in England; and I'm in operational flying for the Army Air Forces. Of the others, a few got out as the months went by but most of them didn't come back.

Air Force has asked me to pass along a few personal experiences in the hope that some idea of what combat against the German *Luftwaffe* is like might be gained from them. Although in this article I must necessarily speak only for myself, it might be borne in mind that my experiences, in many respects, have been duplicated hundreds of times in the R.A.F.

I had about 300 hours in light stuff under my belt before I went across, which meant that my principal training in Britain consisted in gunnery practice and other phases of O.T.U. The training period lasted six weeks, including forty hours in the air and about sixty hours of ground duty.

The R.A.F. was surprisingly lenient with us. The ground courses were not mandatory. Most of the fellows seemed to realize that if we didn't choose to take all the instruction and tips they offered, it would be our necks—nobody else's. That's the way the R.A.F. felt about it.

I took all the training they dished out. And I'm here to tell you, I'm damned glad I did. You can't get too much training in this business.

During the latter part of March, I made my first operational flight—with a British squadron, of course. We were flying Hurricanes then. That first flight was a patrol over the North Sea at night. We were flying at from twenty to fifty feet over the water because that was about the altitude the German bombers usually came in. We didn't spot anything and, all in all, my debut was uneventful, but for the first time I started to feel like I was really doing something.

I flew with British squadrons on ten or twelve sweeps across the Channel from then until about the middle of May, 1941.

We knew our Hurricanes from nose to tail. We knew the Messerschmitts were faster; we could never catch them, nor could we run away from them. They could outclimb and outdive us. But they couldn't outmaneuver us. This we knew—and knew well.

So we played the game with our best weapon—maneuverability.

The Germans in ME-109Es usually would be waiting for us at 32,000 to 35,000 feet. We would go in at about 28,000 or 30,000 and wait for them to come down for us.

Soon they'd come, diving in at about 600 miles an hour, one after the other. But by the time they were set to open up we wouldn't be there. We'd go into a steep banking turn and come about in the hope of getting a squirt at one of them as he went by.

We didn't get many that way (I didn't get any), but they didn't get us either. Those Hurricanes were the toughest fighters in the air. I saw one come home with all but eighteen inches of prop blade blasted off, ailerons and wings shot to hell and more than 100 holes in the fuselage. During the British retreat before Dunquerque, they used wings of shot-down Hurricanes time and again as bridges across ditches in moving trucks and heavy *(Continued on Page 37)*

MEMBERS of the famed British Eagle Squadrons are shown above on their recent arrival from Europe, with Major McColpin, author of the accompanying article, at the extreme left. Others in the group from left to right are Lieut. John I. Brown, 22, Chicago, Ill.; Captain Reade Tilley, 24, Clearwater, Fla.; Major William J. Dailey, Jr., 20, Amarillo, Texas; Captain John J. McCloskey, 28, Washington, D. C.; Lieut. Dale Taylor, 24, Durant, Okla.; Lieut. A. L. Haynes, 32, Norfolk, Va.; Captain Harold Strickland, 39, Detroit, Mich.; Lieut. Bradford W. Boyar, 26, Hamilton, Texas; Captain Sam A. Mauriello, 34, Astoria, Long Island, N. Y.; Lieut. George L. Strauss, El Paso, Texas, and Lieut. Fred C. Smith, 21, Jackson, Miss.

HERE COME THE AIRBORNE

By Brigadier General Fred S. Borum

COMMANDING GENERAL, FIRST TROOP CARRIER COMMAND

AMERICA'S airborne troops are in the news.

During the assault on North Africa parachutists were flown 1,500 miles nonstop from England to attack Oran. This was the longest air invasion on record.

During General MacArthur's drive in New Guinea our planes carried combat units deep into the jungle and dropped tons of food and ammunition to our troops to help humble the Jap.

These were impressive successes. But they are a mere hint of things to come.

A preview of America's airborne strength was held in Texas late last fall. These maneuvers were the first of their kind ever attempted by the U. S. Army and the results were significant.

The basic military problem was as follows:

Hypothetical enemy forces had crossed the Rio Grande from Mexico and driven a wedge into Texas, occupying three airports. Two of these fields were near Eagle Pass and Del Rio, forming a base of the wedge along the river, while the point of the triangle nearest our forces was at Bracketville.

Theoretically, the enemy held these positions with strong units of infantry supported by field artillery of all calibers, and by air forces, machine gun companies, antiaircraft and engineering and service groups.

Our forces opposing the enemy were concentrated outside San Antonio.

They consisted of selected units of parachute troops and an infantry task force of the Airborne Command, 2nd Infantry Division, all under the command of Major General Walter M. Robertson, commanding officer of the 2nd Division.

With these troops were two groups and a glider-equipped squadron of the Troop Carrier Command, Army Air Forces, under the command of Colonel Maurice M. Beach. They flew twin-engine aircraft of the C-47 and C-53 types. (Structural differences between the types are slight.)

Bracketville's "enemy-held" airdrome was the first objective.

Attack upon this base, as upon others that followed, fell into four main phases. Imagine yourself at Bracketville, observing the operation. Assume that the field has already been heavily bombed, as would be the case, when possible, in real warfare.

The Author.

First come the paratroopers. Planes fly over Bracketville at a low level and drop the "umbrella men" to seize and hold the airfield. After a sharp engagement, they gain control and immediately set up radio communications. By this means, together with pyrotechnics and ground panels, they direct incoming transports to landings on the field.

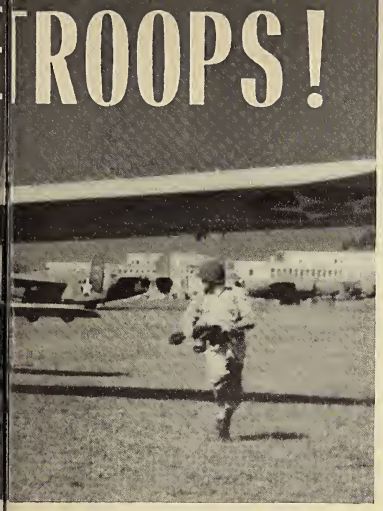
THIS is the second phase—the deplaning of airborne infantry and the unloading of jeeps, trailers, motorcycles, artillery pieces, ammunition and supplies. As quickly as they are emptied, the planes take off again for fresh loads; this procedure continues throughout the day, even into darkness.

Third phase of the pattern of attack comes on the second day and is primarily a problem of re-supply and consolidation. Food and ammunition are dropped by bright-colored parachutes. Additional men and pieces of equipment are brought in.

Here the gliders play their part. Towed by large camouflaged aircraft, the huge motorless ships are quickly cut loose, landed and parked at the unloading area. From each glider rolls a jeep under its own power, rapidly followed by armed men.

Fourth and final phase of the operation is the evacuation of casualties—stretcher cases and walking patients alike—to be followed, ultimately, by complete evacuation

TROOPS!



How we are applying the military science of transporting our men, weapons and supplies by air.

of personnel and equipment as the attack moves forward.

In the Texas maneuvers, three airdromes were "taken" in this manner—Bracketville first, Eagle Pass second, Del Rio third—with the execution showing marked improvement at each step of the problem.

From a flying standpoint, the box score of this tough assignment was most interesting. Here are some figures:

Approximately 1,100 round trips were made between departure fields and objective airports.

Total distance flown was 337,000 miles—almost 14 laps around the earth's equator.

Approximately 14,000 men were transported, plus some 1,400 tons of supplies, equipment, and ammunition. Equipment included jeeps, one-ton trailers, motorcycles, large howitzers, heavy-caliber machine guns, light-caliber machine guns, submachine guns, airport mines, mortars and radios, all in addition to oil, water, gas and one day's rations for the men.

For the flying personnel it was a long, arduous grind. Each ship was manned by a pilot, co-pilot, radio operator and chief engineer. Loadings and take-offs were scheduled far in advance of dawn and the day's work of flying did not end until long after sundown. Men and machines were both taxed to the limit; both stood up incredibly well.

Flying continued under varied conditions, including winds up to 35 and 40 miles per hour, at low altitudes over rough terrain, and frequently in darkness.

Still, in the whole operation not a pound of equipment was lost and not a man was injured. Luck played some part in this record, admittedly.

One ship, for example, suffered a badly damaged wing and the pilot had to make a forced landing just before dawn. But he succeeded in putting his heavily-laden craft down safely in a strange field.

AGAIN, a plane got out of control when caught in a cross wind on a take-off. The ship skidded across a couple of ditches and through a shack, stopping right side up about three-quarters of a mile from the field. But the crew and airborne troops immediately requested another ship and made their objective only a little off schedule.

There were close calls. Eleven hundred round trips cannot be flown without a few uncomfortable minutes. But the coolness of the pilots and the ruggedness of the big "tin geese" they flew won out in every critical situation.

The efficiency of these exercises in airborne warfare, coming only six months after organization of the Troop Carrier Command, was gratifying to all concerned.

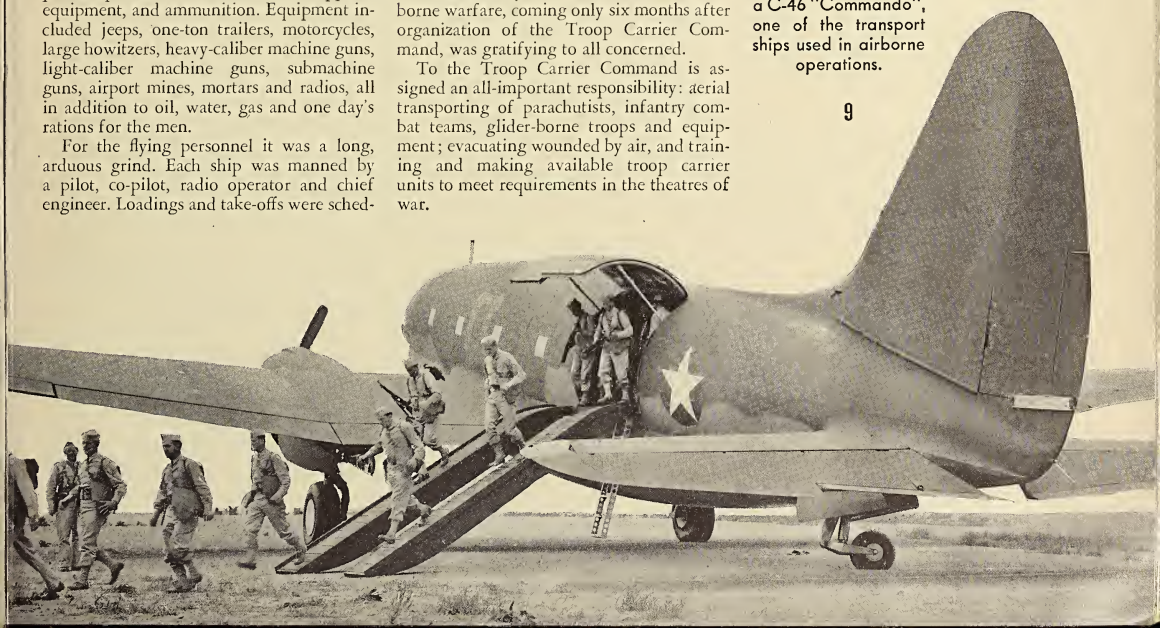
To the Troop Carrier Command is assigned an all-important responsibility: aerial transporting of parachutists, infantry combat teams, glider-borne troops and equipment; evacuating wounded by air, and training and making available troop carrier units to meet requirements in the theatres of war.

Though a relatively new division of the Army Air Forces, the Command already has units operating all over the world. The 1st Troop Carrier Command has its headquarters at Stout Field, Indianapolis, Indiana.

Squadrons are the basic tactical units. To each squadron is assigned Douglas DC-3 type aircraft, designated by the Army as C-47s or C-53s. In addition to the aircraft, gliders for transport of both troops and equipment are standard for each squadron.

Actual warfare complicates problems, naturally. During an actual invasion, it might be necessary to land troops very deep in enemy territory to cut communications or capture an important installation. Ground forces thus transported by plane and glider might be isolated for some time. In that event, the Troop Carrier Command would be responsible for the continued supply of the men, as well as the evacuation of wounded and the transport of air-trained medical personnel.

The Troop Carrier Command represents one of the newest developments in modern warfare. In the evolution of ground-air strategy and tactics, it is certain to play an increasingly important role as new missions are determined day by day. As the Command's motto has it: "He conquers who gets there first."☆



Troops deplane from a C-46 "Commando", one of the transport ships used in airborne operations.

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INGENUITY PAYS OFF ON THE GREAT SALT

By Captain Charles D. Frazer

TWO hundred yards of railroad track stretch across a V-shaped ravine in the Utah mountains. On the track a handcar pushes along, powered by a small gasoline motor. The car is operated from one end by a gunnery instructor, while three students, riding sideways, fasten their eyes to machine-gun sights and train .30 calibers on a row of airplane targets some distance away in the sagebrush. The instructor has interphone contact with each student.

As this contraption joggles down the track, all guns blazing, Captain William D. Keys, commanding officer of the Bombardment and Gunnery School at Wendover Field, grins happily.

For this is another of his "notions." And strictly an improvised affair.

The handcar, ties and rails were salvaged from an abandoned California mine. The track was laid by two enlisted men who were railway employees in civilian life. The interphone is a home-made rig and the stately "bucket seat" occupied by the instructor is really a cut-away Pepsi-Cola pail.

Improvised or not, it teaches gunners to shoot on the move, and that's the objective. Shooting from a bumpy handcar is tough, of course. But the turrets and tail of a heavy bomber give gunners a rough ride, too.

"I think I can tell you what it takes to train gunners," says Captain Keys. "A lot of hard work, a lot of ingenuity and a lot of good non-commissioned officers."

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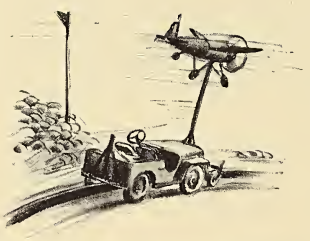
For Wendover is a story of officers and men accepting a prodigious, double-duty job and taking it in their stride with ingenuity that only Americans can understand.

An installation of the Second Air Force, Wendover Field was built originally as a base for second-phase operational training. Heavy bombardment crews come here for intense, day-and-night practice in formation flying, bomb attack and aerial gunnery. They train at what is called the largest bombardment range in the world—some two



million acres of salt flats in Western Utah, an area twice the size of Rhode Island.

A few months ago, the headquarters staff of Wendover was asked to train several hundred gunners at a time in addition to regular duties. This meant building a new school, barracks, ranges and whatnot. And no money was immediately available. The school, however, was built in three weeks and is operating briskly.

When the base at Wendover was first conceived, the town was just a widening of U. S. Highway 50—a cluster of stores and houses and gas stations at the foot of a mountain range hard by the Nevada line. Its population numbered 120. Its only claim to fame was the former headquarters of Ab Jenkins and other auto speedsters who burned the wind down Bonneville flats.

The Army moved in and with it came hundreds of civilian contractors and workmen who lived in trailers back of the State Line Hotel.

In remarkably short time the base was built—complete with three wide runways, four hangars, scores of barracks, two celestial navigation towers, power turret and fire control laboratories, headquarters, BOQs, two post theatres, mess halls and all the rest.

Nature must have had Wendover's training job in mind. Flying weather is excellent, generally, and there is practically no habitation in a hundred-mile radius—just salt flats and desert.

Lieutenant Colonel R. M. Dippy, commanding officer of the base, and Captain Keys, head of the bombardment and gunnery school staff, were quick to take up where nature left off. They observed that automobile tires made deep, noticeable ruts in the salt. So, to make ordinary bomb targets, they simply sent a few jeeps out onto the range, had them driven in a circular path—and there were your pattern targets. This procedure has been followed ever since.

But Colonel Dippy and Captain Keys are never satisfied with the ordinary. They are devotees of drama and realism in training. And, if you fly over the two million-acre range with a bomb crew, that is exactly what you find.

The gray and acrid reaches of the salt flats stretch for miles in every direction. Here and there are gaunt mountains, ridged and jagged and a cold brown in color like the *papier mache* hills of a toy train set. This land once lay under a thousand feet of water—the fabulous Bonneville Sea. And it looks it.

Twenty-five, fifty, and seventy-five miles out on the flats lie the bomb targets.

There is, for example, a 900-foot dummy submarine.

There is a dummy airfield with dummy hangars and airplanes.

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FLATS

How Wendover's men used their brains and brawn to enlarge the Air Forces operational school in western Utah.

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Here again, Colonel Dippy and Captain Keys, with the help of the 325 enlisted men on the bombardment and gunnery school staff, have developed a number of ingenious training devices.

These enlisted men, Captain Keys will tell you, include some geniuses. There is the fellow, for instance, who dreamed up a moving silhouette for identifying aircraft. You sit in a dark classroom. All you see is a large gun-sight. Into this sight, apparently from several directions and distances, flies a procession of foreign airplanes. Some are level, some appear to be banking or diving.

THIS gadget consists merely of two moving picture reels, on which is wound a long roller of plain wrapping paper. Cut out of the wrapping paper are the outlines of airplanes as revealed by photographs in flight. The roller moves back of the gun-sight, and, with a strong lamp playing on it from behind, it looks like an attack is taking place.

This little brainstorm has been adopted by the Air Forces for use at other fields.

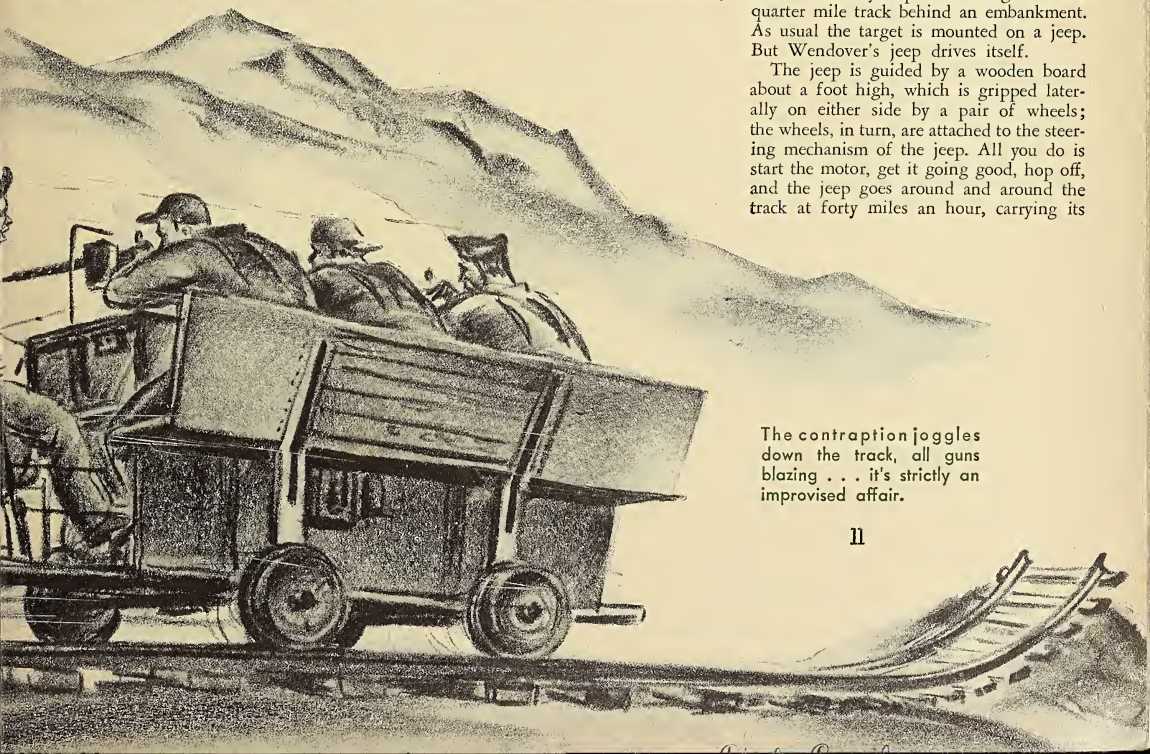
Another enlisted man thought up the little green shack.

While waiting their turn to shoot from that moving handcar, gunnery students stand in a shack nearby. Above and around them in the shack the air is filled with models of enemy aircraft. The models swoop and climb and peel off bewilderingly as they dangle from an endless, moving bicycle chain. A constant class in identification. Everywhere at Wendover you find small buildings like this where you can just walk in and learn something while you wait.

All instruction is done by visual motion, when possible, making it more difficult, more realistic and more effective.

On the main gunnery range, there is the familiar dummy airplane moving around a quarter mile track behind an embankment. As usual the target is mounted on a jeep. But Wendover's jeep drives itself.

The jeep is guided by a wooden board about a foot high, which is gripped laterally on either side by a pair of wheels; the wheels, in turn, are attached to the steering mechanism of the jeep. All you do is start the motor, get it going good, hop off, and the jeep goes around and around the track at forty miles an hour, carrying its



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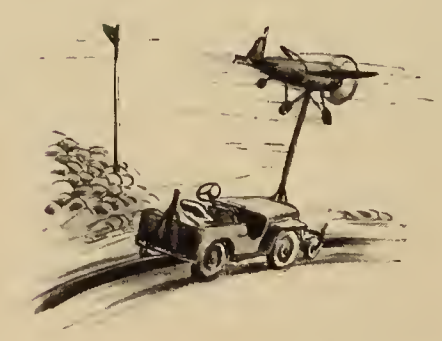

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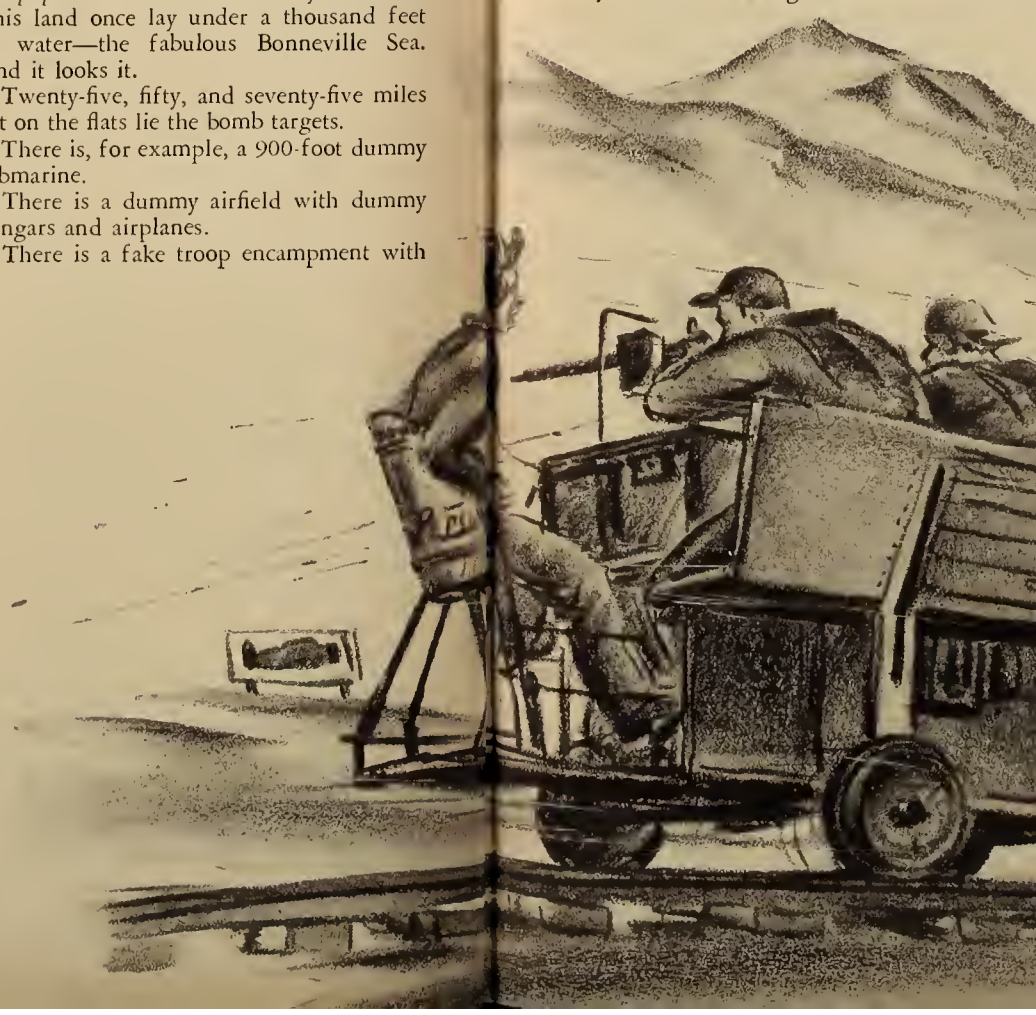


Be The Man Who Gets The Mail

target, and wondering, undoubtedly, what all the shooting's for.

Firing at this driverless demon are gunners in all kinds of stations and turrets. These are quite orthodox affairs, except for a belly turret which is slung from a high stanchion in such manner that the gunner has to shoot from a variety of angles, just as if he were flying in a plane.

THE history of Wendover's new gunnery school is one for the book.

Just about the time the base was being completed, Headquarters of the Second Air Force asked Colonel Dippy if he could handle a few hundred gunners, as well as the tactical O.T.U. groups. More gunners were needed throughout the Air Forces. Certainly, replied Colonel Dippy, but that naturally would mean building additional ranges, barrack and mess facilities, and so on.

Here there was a slight hitch. No more money was available for Wendover at the moment, without a new appropriation, which would take time.

Colonel Dippy thought about the problem, conferred with Captain Keys, and then asked Headquarters for unofficial sanction to build another school, provided they could find ways and means to do it without money. Headquarters said go ahead, and bless you.

What followed is a monument to the word "salvage"—and to the American soldier's enterprise and devotion to his job.

Captain Keys, a flyer and former mechanical engineer, and Staff Sergeant Dalroy M. Ward, a willing assistant who knows his way around, took charge of this construction out of nothing.

First, they found some land. It was a big, forgotten gully in the mountains about three miles back of the main base, owned by the U. S. Grazing Service. They wangled permission to build there.

Next, they and scores of enthusiastic enlisted men on the gunnery school staff put together some home-made bulldozers out of old trucks. With these they built a road back into the promised land.

From another truck they fashioned a ditch-digger that looks like a Rube Goldberg product. But it digs.

Hearing that a few old C.C.C. barracks were lying idle in Utah, they hurried to Salt Lake City and talked somebody into donating the structures. Trucks were borrowed from Colonel Dippy's motor pool to cart out the frames and lumber of these buildings. Trucks are forever being borrowed from Colonel Dippy.

A general scouring of the countryside then followed. Captain Keys told the men to salvage anything not being used elsewhere. One thing badly required was cement, so he appointed a standing "cement detail" to bring in what could be found. If, for example, there was any cement left over from the building of runways down at the base, what better use for it could be imagined?

Soon, for a person at the base, it was almost fatal to lay anything down. And the storehouse of the new school became a treasury of odds and ends.

Small pieces of lumber (up to fourteen feet or so), left-over bits of cement (up to sixty bags a day), lengths of pipe, old stoves, pool-tables, pieces of chain, bedding, paint—all such stuff began to appear out of thin air.

Welding and concrete-mixing machines were borrowed from a private contractor in town. Incidentally, Captain Keys has a phrase to describe people who helped out. "There was a patriotic man," he will say.

One after one, a long row of barracks went up. These were followed by a carpenter shop, a mess hall, and a building that houses a mail room, PX and barber shop.

It was not all plain sailing. There was a bit of trouble with rattlesnakes. "But we make it unpleasant for them," explains Sergeant Ward. "We kill them."

They could neither "beg, borrow or steal" any U-bolts to erect double-deck beds. They found some telephone wire and two-by-fours, however, and made double-deckers by wiring single beds one above the other on wooden uprights.

After living quarters were built, the home-made bulldozers soon carved gunnery ranges from the hills flanking the ravine. No butts were needed, of course. Then a skeet range took form.

NOBODY seems quite certain as to where all the gun turrets came from. It is remembered, however, that after a couple of ships cracked up on the field nobody saw any parts lying around.

The salvagers did not forget their own comfort. They found an Indian cave in one of the hills, complete with ancient etchings on the walls. A bit of a cement floor, a bit of a bar—and it became as fine an n.c.o. club as anybody could wish.

Some things were bought, naturally. A printing press was one. "It's not quite paid for yet," says Captain Keys, "but it soon will be." The fellows in the printing shop, it seems, help on the financing by doing stationery for the men at a small but profitable fee. Tools and spark plugs are bought with profits from beer parties.

And some things were donated. An indication of the esprit de corps at Wendover is that one man contributed $7,000 worth of radio equipment—his personal property—to the aerial gunnery school.

Colonel Dippy, an engineer, estimates that at this new and home-made school a $1,000,000 job has been constructed in the record time of a few weeks at a cost of absolutely nothing. Thus has Wendover vastly increased its training capacity.

When the whole story of the Army Air Forces training program is written, Wendover may deserve a chapter of its own. If so, Captain Keys has a title:

"A lot of hard work, a lot of ingenuity, and a lot of good non-commissioned officers." ☆

Organization of the Army Air Forces

By Colonel Byron E. Gates

ASSISTANT CHIEF OF THE AIR STAFF, MANAGEMENT CONTROL

THE present organization of the Army Air Forces is the result of a gradual growth brought about by the experience of modern warfare. That experience has emphasized the vital importance of the air arm and has necessitated a drastic reorganization of the War Department and the Army in the interests of greater combat efficiency.

For a year and a half after the beginning of the present world conflict, the War Department and the Army were organized substantially in the same manner as in 1920 when the National Defense Act was passed. That Act, which embodied the lessons of the first World War, provided for an Army consisting of arms and services of equal rank, each headed by a chief, namely: Infantry, Cavalry, Field Artillery, Coast Artillery, Air Corps, Engineers, Signal Corps, Ordnance, Quartermaster Corps, Chemical Warfare Service, Medical Department, Finance Department, Inspector General's Department, Judge Advocate General's Department and The Adjutant General's Department.

Each branch was organized into divisions, corps and armies, most of which during peacetime were merely paper organizations. Administration within the United States was conducted through nine Corps Areas, each under a Commanding General. The War Department General Staff, over which the Chief of Staff presided, supervised and directed the Army in the name of the Secretary of War.

As a concession to the growing importance of the air arm, a General Headquarters Air Force was organized which operated directly under the War Department General Staff. Aviation was thought of as largely an auxiliary of the Ground Force.

However, the exploits of the Luftwaffe in the European campaigns, the Battle of Britain and the air conquest of Crete emphasized the necessity of building up the Army Air Corps. On June 20, 1941, Army Regulation 95-5 created for the first time the Army Air Forces as a semi-autonomous body within the Army. The name of the General Headquarters Air Force was changed to Air Force Combat Command; it and the Air Corps were placed under the control of a newly created officer, the Chief of the Army Air Forces. Lieutenant General Henry H. Arnold was named to this position and also was made Deputy Chief of the War Department General Staff. He was given substantial powers in connection with determining the training, personnel, equipment and supply requirements of a modern air force.

The rest of the Army continued to operate under the old organization, except that a General Headquarters was activated at the Army War College under Lieutenant General Leslie McNair. General Headquarters made plans for utilization of the Army of the United States in combat. The War Department General Staff continued to operate as it had previously.

Experience indicated several weaknesses in this type of organization, and the action at Pearl Harbor and in the Philippines, together with the sinking of the Prince of Wales and the Repulse, again emphasized the vital role of air bombardment as an offensive weapon. A comprehensive reorganization of the War Department, set forth in the now famous Circular No. 59,

A close-up of the ever-changing structure of America's air strength and its function under the stress of war.

March 2, 1942, resulted. Three general principles governed this reorganization:

1. The Chief of Staff became the unquestioned military commander of the Army of the United States. G.H.Q. was abolished.

2. It was determined that actual combat should be controlled by task forces and theaters of operations commanders responsible directly to the Chief of Staff.

3. To provide the trained personnel and equipment necessary to fight efficiently, the Army was divided into three components of equal rank: The Army Air Forces, the Army Ground Forces and the Army Services of Supply. Units trained and equipped by these three components are formed into task forces organized to meet the needs of particular theaters of operations, where they fight under the command of the theater commander.

The present organization of the Army Air Forces is aimed to fulfill the mission laid down in Circular No. 59:

"The mission of the Army Air Forces is to procure and maintain equipment peculiar to the Army Air Forces, and to provide air force units properly organized, trained, and equipped for combat operations."

The chart on the rear inside cover of this issue of AIR FORCE is a graphic presentation of the organization which has resulted. War is dynamic, not static. Experience constantly indicates the need for a change of organization to meet changing conditions. The chart now current is not identical with that first adopted last March. Perhaps by the time this article is published other changes will have been made. However, it is unlikely that the basic principles on which the organization was founded will be modified. The organization consists of Headquarters, Army Air Forces, and the various Air Forces and commands.

THE following principles govern the organization of Headquarters, Army Air Forces:

1. Because the Air Forces are part of the Army and a military organization, it is desirable to retain—under the Commanding General and the Chief and Deputy Chief of the Air Staff — the classic military staff divisions of Personnel,—A-1; Intelligence, A-2; Training and Operations, A-3, and Supply, A-4. These divisions keep in constant touch with G-1, -2, -3 and -4 of the War Department General Staff.

2. It is desirable to separate planning functions from those of an operating nature to permit consecutive thinking and analysis of over-all policies, plans and programs to insure that they fulfill the mission of the Army Air Forces. For this reason the "A" divisions of the Air Staff are kept small and are divorced from operating functions.

3. To aid the A-Staff in making policy, it is desirable to have:

a. A section where plans of an operational nature are analyzed, broken down into the personnel, intelligence, training and supply sections and brought together again as an integrated whole after analysis by the "A" divisions. This is the function of Operational Plans.

b. It is also desirable to plan the program pursuant to which the mission of the Army Air Forces will be performed, i.e., to determine when and in what numbers units must be activated; when they will be fully equipped and trained, and when they will be ready for combat duty. This is the function of Program Planning.

c. It is further desirable to coordinate the vast administrative organization of the Army Air Forces. Producing units trained and equipped for combat has many of the aspects of big business. Every large corporation has its control division which keeps in close touch with operations and supplies (Continued on Page 40)

How to Keep Well in the SOUTHWEST PACIFIC THEATER

Brigadier General David N. W. Grant
THE AIR SURGEON

The following article is the third of a series on health conditions in the various theaters of operation.—THE EDITOR.

IN THE East Indian archipelago and on the islands to the east there are a number of pitfalls to snare the unwary, and many of these are associated with disease. The white man's culture has made little headway in this part of the world. With few exceptions, the native people live as their stone age forefathers did before them.

Head hunters and cannibals are found in New Guinea and some of the other islands and will attack if given an opportunity. Soldiers on guard duty at night or alone in the jungle must take special precautions to avoid such attacks.

Because of poverty and ignorance, few attempts are made to combat the many diseases that exist here. Disease forms the final link in a vicious circle that saps the strength and initiative of the people. Yet, all of these diseases can be controlled if certain simple precautions are taken.

Military operations in this theater are frequently carried out by small units or by individuals. A basic knowledge of the hazards that exist, and of the ways to avoid them, will make it possible for personnel to better care for themselves when thrown upon their own resources. This knowledge will also help the individual appreciate the absolute necessity for the strict sanitary precautions that are enforced in the vicinity of all military installations—whether bases, airfields or front line fox-holes. Conditions may vary somewhat from island to island, but with few exceptions the same diseases are common to the entire area.

Mosquito-borne diseases are of primary importance. Every part of the region is infested with one or more of these diseases. A rule of thumb states that in the Pacific malaria is found west of 170° east longitude and north of 20° south latitude. Although there are exceptions to this rule (malaria is occasionally found south of 20° south latitude), for all practical purposes it indicates the highly malarious areas of the Southwest Pacific.

Malaria in this part of the world is especially grave. Practically 100 percent of the people have the disease and it is the greatest single cause of death among them. Dengue, sometimes called "breakbone fever," commonly attacks newly-arrived Europeans and Americans and, although not fatal, is capable of causing great discomfort. Its control is especially important since it can incapacitate a large part of a military command at one time. A third mosquito-borne disease is filariasis. This disease becomes chronic and may lead to marked swelling of the limbs and scrotum-elephantiasis.

THE presence of these diseases makes it imperative that every man be thoroughly versed in the various methods of protecting himself from mosquitoes. First and foremost, he should know the value of his mosquito net and how to care for it. It should be considered an essential piece of his equipment, and should be kept available at all times. Stay indoors as much as possible after dark, but if it is necessary to go out at night wear extra clothing that covers the entire body. Do not wear short-sleeved shirts or "shorts" after the sun has set or when going into the jungle. Malaria-bearing mosquitoes frequently come out only at night and even though no mosquitoes are to be seen locally when the camp is made, there probably are mosquitoes present that will come out about eight or nine o'clock in the evening. The bite of these mosquitoes frequently does not sting and may pass unnoticed. Available insect repellents are of little value, especially if you are sweating, so it is better to use such safety measures as mosquito boots, head nets and gloves. Avoid native villages, for the people act as a reservoir of these diseases and mosquitoes are very common among them.

The so-called suppressive, or prophylactic treatment, with either quinine or atabrine, is useful in many parts of this area. Although this method of treatment does not prevent malaria and thus does not take the place of the previously mentioned precautions, it does suppress the symptoms of malaria so that a man is able to carry on until the tactical situation allows sufficient time for more thorough treatment.

The native people have little knowledge of sanitation. They carelessly deposit human wastes and garbage in any convenient spot and rarely take precautions to secure safe drinking water. It is not an uncommon sight in many parts of the islands to see a house built out over a stream or lake. Two holes are found in the floors of these houses—one through which water is drawn for drinking purposes, the other used as a toilet.

The presence of flies, which occur in great numbers in all native villages, and of polluted water is of great importance to troops, for they are the common means by which the intestinal diseases—typhoid fever, dysentery and cholera—are carried to man. Because of the universal presence of the common intestinal diseases throughout this area, only water that has been treated by appropriate army personnel should be used. Boiling is the best and easiest method of purification. Even rainwater just caught, or water from a sparkling mountain stream, must not be drunk without purification. For his own protection, each individual should know two or more methods of purifying water. (F. M. 21-10).

Although adequate quantities of water are available on most parts of the islands, a thorough knowledge of conservation of water is essential, for there may be times when the tactical situation does not permit stopping long enough to prepare it. A man can survive for four or five days on one quart of water a day. In order to get the full benefit of such a small quantity of water, it is necessary (Continued on Page 29)

COMPRESSIBILITY

— Its Effect on Aircraft

A study of difficulties encountered in going too fast and trying to get too much lift out of a plane's surface.

By Colonel Ben S. Kelsey

PRODUCTION DIVISION, WRIGHT FIELD

A PILOT reported that his airspeed indicator was reading better than 550 M.P.H. at 15,000 feet; actually, he was going downstairs at something pretty close to a thousand feet a second. He might have been in a bullet which had a velocity of a little more than the speed of sound.

A pilot did a half-roll dive with full power and couldn't exceed a certain speed. In other words, he had reached terminal velocity and the airplane was slowing up.

During a dive a pilot noticed a sound as if sheets of tin were being torn off the airplane. Some little "shock waves" or "sound waves" had formed around the cabin.

During a test dive a pilot was pushing on the stick up to a certain speed and then had to pull back the stick to keep from having the dive increase. Some compressibility effect had caused a change in trim.

At 30,000 feet in a vertical dive a pilot reported that on recovery the airplane buffeted and apparently recovered slowly; for some reason or other, the plane did not appear to get the lift it should have from the wing. High speed and compressibility had caused a loss in lift.

Variations of the above examples can be cited many times. They are usually connected with high speed dives, but there are conditions where variations of these effects can be observed even in level flight or in normal maneuvers, particularly at high altitudes. There must be many more such experiences which have not yet been reported or encountered.

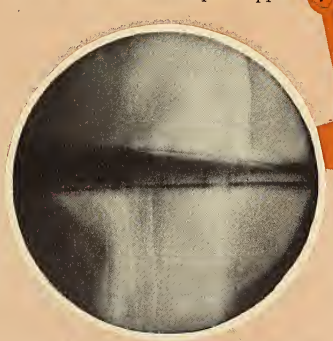
A pilot should understand, if he is to analyze what is going on around his airplane, a few simple fundamental physical laws. The first of these is that the airspeed indicator is measuring dynamic pressure in a hole facing forward into the air. The airspeed indicator does not tell how fast the airplane is moving; it simply tells how hard the air is pushing into the hole.

Obviously, as altitude is increased and the air becomes less dense, the push or "dynamic pressure" decreases for the same "true speed" through space. The correction factor for indicated airspeed with altitude should be kept in mind. The pressure varies with temperature and altitude, and a rough approximation is that the true speed is obtained by taking the indicated speed and adding an amount equal to 1.4 percent additional for each 1,000 feet of altitude.

Altitude speed can be obtained by adding 1.4 percent times the altitude in thousands of feet to the indicated speed. For instance, 300 M.P.H. indicated at 20,000 feet would really mean that the true speed was approximately 128 percent of 300 or approximately 385 M.P.H. A more exact correction would give 400 M.P.H.

THERE are available indicated airspeed correction charts and calculators on which a number of typical examples should be worked out so that a feeling for this factor becomes automatic; for instance, indicated speeds of around 300 M.P.H. at about 20,000 feet should be immediately translated into true speeds of 100 M.P.H. higher.

In high-speed flight, the speed of sound becomes a real factor since it determines the speed at which shock waves are formed. The speed of sound at sea level is approximately 758 M.P.H. but decreases to 685 M.P.H. at 30,000 feet. If one were to fly at the indicated airspeed of sound as measured by an airspeed indicator, the variation in this so-called critical speed apparently would be very much greater. For instance, the airspeed indicator would read 758 M.P.H. at sea level, but only 460 M.P.H. at 30,000 feet. Compressibility affects the airspeed reading itself and compressibility on the airplane may affect the pressure in the region of the airspeed measuring head. These effects thus may tend to give readings that are too high.



SHOCK WAVES, which greatly increase the resistance of the wing section, stand out vertically in this photo of a wing traveling at 580 miles per hour.

When airplanes move through the air they push the air around. The air has to flow up over and back down behind the wing, and around the various bodies and obstructions. The result is that as far as the air is concerned it apparently moves with respect to the airplane at a much higher speed in some local spots than the straight-away speed of the airplane itself. A typical example would be around the curved leading edge of a ring cowl where the air may be moving at a speed relatively one and a quarter times the speed of the airplane, or over the bulge of a thick wing where it might be even twice as much. This means that there are local points on an airplane which have extremely high local relative air velocity and these points may be subject to compressibility effects before the airplane as a whole has actually approached the speed of sound.

In order to talk about these critical speeds as proportions of the speed of sound, the expression used is "Mach's Number." This number is simply the percentage of the actual speed of sound at that altitude or condition; for instance, a speed of .85 or .67 times the speed of sound would be a Mach's Number of .85 or .67, respectively. It's just for convenience, but it sounds very technical to rip it off like a scientist.

As far as the fighter pilot is concerned, he will at some time or other be aware of some condition for which compressibility is to blame. He should learn to anticipate the possibilities and look over his ship with this in mind.

A few illustrations may make the effects more obvious.

Accompanying a shock wave is a tremendous increase in drag. This may do a lot of things. The most obvious is that the diving speed may be sharply limited by the rapid build-up in drag of a number of items that are small in themselves. A sharp edge around a windshield canopy joint may put a limit on the maximum speed long before it would be expected due to the normal drag increase with increasing speed. Pieces of cowling, window panels, etc., may be torn off or broken although design indicates that they

are many times stronger than any load which could be put on them. The formation of the shock wave may actually imply that a blow or impact is delivered when it forms. Any bulge, sharp corner or edge, or an abruptly faired protuberance, should be looked on with suspicion, and a junction of two such protuberances, where the maximum displacement of both occurs at the same point, is almost certain to be a bad spot.

When a bullet cracks overhead the shock wave is in evidence making noise. Inside the bullet there is probably a continuous rattling, banging or tearing. When compressibility occurs on an airplane, it frequently sounds as if Gremlins were ripping off sheets of covering with jimmies and ice tongs. This may well be disconcerting, but in itself is rarely embarrassing.

Shock waves unfortunately are not as clean cut and sharp as we are apt to describe them. The regions of compressibility may be fuzzy and may develop over a period of time, and over quite an area, particularly on a wing. As discussed in AIR FORCE last month, the breakdown in flow over the wing causes a loss in lift not unlike that caused in a stall. This loss in lift will be accompanied by a rearrangement in the pressure distribution over the wing.

The pilot will observe this rearrangement in several ways. The most common condition is a change in trim in dives. A stable airplane should try to return to its trimming speed, so, when dived, it would normally try to nose up more and more as the speed increases. If the breakdown is gradual, or if the speed just gets over the threshold without really breaking into the compressibility region, this trim change may be simply a slight reversal or lightening of stick forces which can be handled easily. It may require adjustment of the trim tab or even require pre-setting the tab and carrying larger loads in the early stages of the dive or recovery. When the airplane really breaks over into high speeds or when the shock waves are big fellows, the changes in trim may be very large and very sudden.

THE loss in lift would normally be noticed in recovery from a dive when it feels as if the airplane were mushing and wasn't coming out very well, although one would normally expect a very solid feel at the speeds involved. As discussed previously, the more lift we try to get the worse the disturbance. We can easily imagine the same condition taking place on a control surface itself when we try to get big control forces from it at these high speeds. The loss in effectiveness would seem to be a stall, and might result in apparent lightening or loss in control. This may be combined with the loss of control or change in downwash resulting from disturbed flow behind a compressibility region up forward somewhere. Local compressibility, on an air scoop for instance, may upset the trim all by itself.

We know that whenever we have a sharp corner we get shock waves because the air can't make the sharp turn at these high speeds. This brings up some other control possibilities. The bend at the elevator hingeline when the stick is pulled back, for instance, might precipitate a region of compressibility. This would be accompanied by a big change in pressure distribution over the surface. If the pressure peaked at the point where the aerodynamic balance was located, we could easily have a condition where all the load was dumped there, momentarily overpowering the controls. The same condition could exist where an aileron balance, with its sharply curved leading edge, sneaked out from the protection of the wing at high speed.

LOOKING at the waves made by a boat, it is apparent that most of the motion is up and down and that the water is not moved with the boat. However, the water can't be built up in hills without shoving some of it along. Not very far or very fast, but a little. It is also evident that a boat disturbs water a long distance away from it.

Probably if we could color a small section of air and watch it when an airplane runs by at supersonic speeds, we should think of the air as merely squeezing up and then popping back without going much of any place. Actually, the air gets carried along a short distance, and not smoothly either, so that the wake behind anything making shock waves is a very disturbed place. Also, this disturbance extends out a long way from the object causing the disturbance.

Unfortunately, in airplanes, we usually have tails in the rear and if compressibility in any magnitude occurs up forward, the tail may have to wade through air that looks like the rapids at Niagara Falls. The result is a buffeting or beating. Sometimes this is much like tail flutter except that it isn't self-supporting and is less inclined to be destructive, but it can be uncomfortable. The same buffeting on other parts may be evidenced in peculiar vibrations or noise.

Since compressibility can be precipitated by trying to pull a lot of lift at high speed, the act of trying to get lift may cause the condition which breaks down lift, and the breakdown may cause a loss in acceleration which in turn can cause a re-establishment of lift. It is easy to imagine a trim and speed condition leading to a hobby-horse ride and a bucking one at that. At the same time, drag builds up and lets down with the formation of shock waves and their breakdown so that if this were to take place on one wing or the other unevenly, the airplane could swing from side to side with a combined roll like a drunken sailor.

Speaking of trouble, it is always simpler to *stay* out of it than *get* out of it. Compressibility is no exception to the rule. If airplanes can be operated so as to avoid exposure to this condition they certainly should be. Maneuvers should be devised so as to avoid the necessity for getting involved, and preliminary signals should be recognized as warnings to get out of the area.

In general, compressibility difficulties are caused by going too fast and by trying to get too much lift out of any surface for that speed. Therefore, a reduction in speed is indicated, obviously. Next, avoid attempting sharp pull-outs or big control displacements.

Don't dive with cracked or poorly fitting windows, or loose or bent cowling; if you do, the stuff just leaves the plane, and something else may get hit in the process.

A PILOT feels as if he wanted high lift devices to help him but these just make things worse so he has to content himself with taking what he can get, gently.

Since the speed of sound increases at lower altitudes and since airplanes slow up as they come downstairs in steep dives, conditions get better at lower altitudes, but this is sorry insurance.

In general, throttling back is helpful, but since the props are wind-milling anyway in all probability it is just a matter of affecting the disturbance behind them.

Use the trim tab to help with trim, and, if necessary, for actual control, but this also involves a reversal when normal flow is re-established.

So far, these effects are mostly confined to diving conditions, but at high altitude poor fillets, open windows and other disturbances in regions of high local velocities may cause compressibility effects without the trouble of sticking the nose down.

The dives involved in reaching these critical speeds are not accidental, and even without any of these effects they commit the pilot to a tremendously long recovery.

It is foolish for a combat pilot to throw away the initiative by deliberately putting himself in the compressibility region.

We know little more about the supersonic region than the Sunday afternoon sailor does about the sea when he sets out to sail around the world in his 30-foot boat. Some of the sailors make it and learn a lot, and in the same way quite a few pilots have learned a lot about the relatively unknown region of compressibility. There is no corner on the compressibility market, no one has bought it all up, and everyone who goes over 500 or 600 M.P.H. is exposed to it in some degree. Like all unknown regions, it should be explored cautiously, avoided when possible, but if entered necessarily or inadvertently, observed carefully and in the light of general conditions and knowledge.

This is the second of three articles on Compressibility. The third will appear in a succeeding issue. ☆

A bombardier's story of his first operational flight against the Japanese in the Aleutians.

BAPTISM OF FIRE

By Technical Sergeant L. O. Gardner

THIS article was judged the winner of first prize in a contest held for the best written narrative by members of combat crews participating in an attack on two Japanese destroyers of the Hibiki Class on October 16, 1942, near Kiska Island in the Aleutians. Technical Sergeant Gardner was bombardier in a B-26 aircraft in that attack. AIR FORCE *is happy to print the article and, as a medium of expression for the entire Air Forces, will welcome the receipt for publication of articles and short subjects from the combat areas.*

OCTOBER 16 was apparently just another day, except the perpetually dismal Aleutian weather had lifted and Old Man Sol revealed his cheerful face, a phenomenal occurrence.

I casually glanced at my watch. The afternoon was just about over. I wondered what my wife was doing. I noted that several of our ships were warming up at the end of the runway. Lieutenant Hellesvig, one of our navigators, walked by.

"Lieutenant, do you suppose my ship will go on any of these missions soon?" I asked.

He glanced at a slip of paper in his hand, hesitated.

"Why, yes," he said, "You'd better hurry over there. I think you're going on this mission."

My heart jumped. I swung around and started running for the end of the runway. Just then, I noticed a "jeep" speeding in my direction, purposefully. It got to me, swung around and one of the boys on it yelled:

"Hop on, quick! You're on this mission."

I jumped on and we headed for the plane. The jeep slowed down, swerved, and I jumped off and started running for the ladder.

Lieutenant Maurer, the pilot, with a grin, said, "I knew you were around here somewhere," and turned back to the controls.

He started the engines up. We heard two other ships roar by on the take-off. We taxied to the end of the line, waiting our turn for take-off. I set the navigator's altimeter. I noted that my fellow crew members were Staff Sergeant "Baldy" Hanson and Corporal "Red" Melvin respectively, radio operator and gunner.

Lieutenant Maurer revved the engines up. We started moving, swung around, and suddenly we were thundering down the runway for take-off.

We quickly gained an altitude of 500 feet, circled the field and slid into formation with the other airplanes. By that time, we were rounding the mountain on the north end of the island, and we started to look after our guns and equipment.

I opened the bulkhead door between the navigator's compartment and bomb bay and squeezed my way to the rear of the bombs. Anxiously, I checked over shackes, arming wires, electrical connections. Satisfied I pulled the pins that would render the bombs "Messengers of Destruction."

I crawled back through the bulkhead door and reported everything O.K. to the pilot. He nodded me to go forward into the nose.

I crawled past the co-pilot, Lieutenant Nielsen, and slid between the rudder pedals and into my seat.

Turning on my indicator switch, I glanced at the panel to see that all bomb stations were lit. Everything satisfactory, I slipped on my headset, called the pilot on interphone and requested permission to test fire my machine gun. I loaded and checked the gun and fired a five-round burst.

Lieutenant Maurer called me, "Gardner, do you know anything about this mission, or what we're supposed to do?"

"No, sir."

"Come on up here where I can talk to you and I'll explain as much as I can."

I crawled out of my cubby hole, between the pilot and co-pilot, then turned around. Lieutenant Maurer explained the mission and illustrated our plan with a sketch.

"We'll be there in approximately 45 minutes," he said.

"I understand now, Lieutenant," I said. "Any further instructions?"

"Yes," the pilot said, "There's a rock just off this island ahead. Let's make a run on it and drop one of our bombs to get 'warmed up' and test the bomb racks."

I crawled back into the bombardier's compartment, opened the bomb doors and waited for the red light to go on, so I could put the control lever into "Selective." The target came up. I toggled off one bomb and leaned forward *(Continued on Page 24)*

WHAT'S WRONG WITH THIS PICTURE? Enough to make a line chief's hair turn gray before the job is finished! The boys are really fixing this ship; fixing it so no one else can fix it—or fly it. THIS IS HOW MEKIWIS ARE MADE. Aside from the fact that the propeller work should be supervised by propeller specialists whenever possible (and these boys obviously are not propeller specialists), there are nine maintenance boners pictured here. Can you find them? Answer on opposite page.

On the Line

A feature by—and for—the ground crews of the Army Air Forces whose hands, skill and precision keep our planes flying and fighting.

THANKS for the response to January's ON THE LINE. We want more of your comments and suggestions. ON THE LINE is YOUR feature; it will be just what YOU make it. This month's maintenance boners were picked and posed by Staff Sergeant John J. Hines and Sergeant George S. Jones of Patterson Field, Ohio.

DID YOU KNOW . . .

That Tech Orders, Service Manuals and Handbooks are being illustrated in color and high-spotted with functional cartoons that teach a lesson and give you a belly laugh at the same time?

That paragraph 5h T.O. 00-25-3 provides that each tactical organization be furnished, for spare-time reading, ten extra copies of all Tech Order handbooks pertaining to the Equipment it operates? Ask your Engineering Officer about it.

That YOU can be a very important factor in improving the design of airplane engines and accessories and in preparing Tech Orders to correct unsatisfactory conditions? Your form 54s (Unsatisfactory Reports), covered by AAF Regulation 15-54, are analyzed very carefully by headquarters. Those pertaining to engines and accessories are forwarded to the appropriate manufacturers for study with a view toward improvement of design.

Master Sergeant Leonard F. Girard of Mitchel Field suggests that we stress the following:

TOWING . . .

When towing planes one man should be in the cockpit operating the brakes at *all times*. And better be sure one man is walking beside each wing to check clearances—or you may lose a wing tip.

The correct tow rope should be approximately three and one-half times the tread of the airplane (distance between wheel centers). Be sure to use the proper towing facilities for the ship. Technical Order Handbooks applicable to each airplane should be referred to for the recommended method of towing. See T.O. No. 01-1-50.

Too long a rope puts the tug operator too far from the plane for exercising proper control of its movements; too short a rope is extremely dangerous to the tug operator. That may be you. Better watch it.

FIRE PREVENTION . . .

Things to be remembered: That adequate fire-fighting equipment must be readily available when cleaning aeronautical equipment, which should be done only under competent supervision. See T.O. No. 01-1-1.

That gasoline trucks, whether loaded or empty, will neither enter nor be stored in hangars; that the practice of paint spraying in hangars is prohibited. See AAF Regulation 85-6.

And many a disaster has been avoided by having a fire extinguisher within easy reach when starting or servicing a plane.

SPARK PLUGS . . .

Don't forget to put a thin coating of Spark Plug Thread Lube on the shell threads when installing spark plugs. (If you've ever had to get plugs loose that were frozen—you know what we mean!) Caution: Do not permit the lube to come in contact with the electrode or firing end of the plug. See T.O. No. 03-5E-1.

PAINT REMOVERS . . .

Avoid spilling acetone, denatured alcohol or paint remover on painted surfaces of aircraft as these solvents will attack the paint.

BE CAREFUL . . .

A flight surgeon suggests that if it becomes necessary to use a volatile fluid to remove some substance from the hands or body, be careful that you never use other than Grade 65 fuel. All fuels having an octane rating greater than 65 have tetra-ethyl lead added to reduce detonation. Tetra-ethyl lead is extremely poisonous and is readily absorbed through the skin. Under no circumstances should leaded fuel be used for removing substances from the hands or the body. If volatile fluids are to be used in cleaning parts, be sure to observe the precautions and procedure prescribed in T.O. 01-1-1.

Avoid breathing vapors of volatile fluids.

NEVER spray carbon tetrachloride solutions on hot metal or fire, as the carbon tet, when heated, gives off phosgene—one of the most poisonous of gases.

Mistakes on Opposite Page

Reading from left to right:

1. Put that cigarette out before you blow up the works—mistakes and all. You should know there's NO SMOKING in a hangar or within fifty feet of a plane. See AAF Regulation 85-6.

2. NO, NO, NO—please, don't beat the nicks out of the prop with a pair of pliers and a steel hammer. Follow the procedure for propeller repair prescribed in the T.O. 03-20 Series.

3. Stop it, Rembrandt! Propellers should never be brush painted. They're always sprayed in a horizontal position and checked for balance. No attempt should be made to touch up surface of blades when finish becomes chipped and unsightly. See T.O. No. 07-1-1 for complete details.

4. The propeller hub is not the place to rest a can of paint—or anything else, for that matter.

5. Your foot doesn't belong in the engine cowling. It's thoughtful of you to protect it by using the rag under your foot, but it's better to use a maintenance stand. T.O. No. 00-30-19 tells you how many stands your organization is entitled to.

6. And speaking of maintenance stands, why not use one instead of stacking one work-stand on top of another?

7. Look out for the tool box! It's in a fine position to get kicked off.

8. And tools should not be scattered around on the stand. It's bad practice and, if you're not careful, you'll slip on one and break your empennage.

9. Hey, what's that crowbar doing here? You're supposed to be fixing the plane—not wrecking it. This tool should never be used on an engine. Use only authorized airplane and engine tool sets as specified in the airplane or engine handbook. Also see T.O. No. 00-30-45.

Jungle FRONT

The building at left is the officers' club. It may not be like the Waldorf but it offers relaxation for tired airmen just the same. Built by the officers themselves, it is made of bamboo and other woods.

Flying officers (above) relax in their home-made clubhouse. The magazines, not the latest by any means, are read thoroughly anyway. Besides the "library," the building also houses a ping pong table, some miscellaneous tables and chairs, and a bar. When not reading or writing letters home, these officers spend their leisure hours in "hangar flying."

The first structure to be erected at a new field is the control tower (right). After the control tower is up and manned, operations can be started, even though other installations are not yet completed.

ON tropical islands of the Southwest Pacific, far from the modern hangars and comfortable quarters they knew in this country, Air Force flyers and ground crews are bringing their civilization to a primitive area now used as a battle ground.

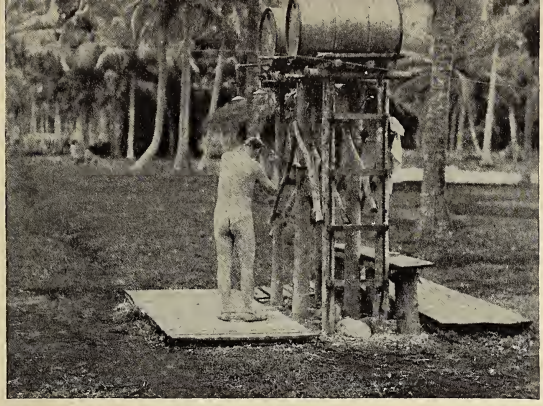
Plunked down in a part of the world that never saw an electric light, an automobile or a white man until a few months ago, these airmen have sprinkled the jungle with evidences of their own way of life. They've done it partly with what they brought with them, partly with what they found in the manuals, but mostly with just plain ingenuity.

Today landing mats spread across clearings where monkeys used to play, improvised maintenance devices nestle among coconut and bamboo groves, and such Americanisms as home-made clubhouses and shower baths fringe the darkness of the jungle. These things have all aided in the victory over the tropics, a victory that is a necessary prelude to the victory over the Japs.

These pictures show what the boys are doing when they aren't blasting away at the Japs.

A modern station wagon, Army car and tent mingle with coconut trees in a South Sea setting. Behind the clearing is the camouflaged operations office.

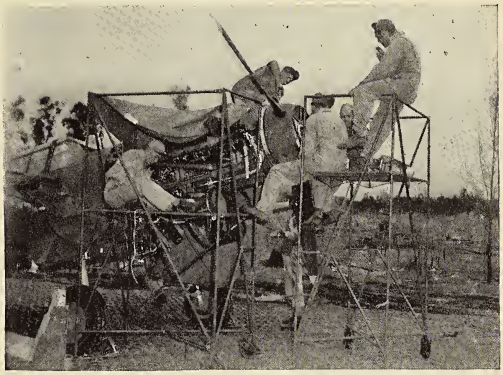
Almost invisible in the dense tropical foliage is this beautifully camouflaged operations office. It looks quiet but it is really the center of base activity.



A home-made shawer pravides a pleasant escape from the trapical heat—at least until the water runs out. When it's gone the barrels at top have ta be refilled.

Hydraulic equipment might be better, but these mechs still do a gaad jab af lifting this pursuit ship with an impravised hoist.

Airplane batteries are recharged in this "hangar." Extra care is necessary because spare parts are virtually nanexistent.



A trapical sky is the roof of this South Sea hangar. Canvas sheets keep the weather off the plane as several mechs swarm about.

A butcher knife snitched from the mess hall helps this colored soldier expertly weave the walls af a new building from palm fronds.

The nose of a P-39 makes a gaad stave for brewing a Sauth Seas tea party after the triumphant airmen have returned fram a stiff fight with the Japs.

ANAXIMANDER (611-546 B. C.), a pupil of Thales of Miletus, made the "first map of the world", which was then thought to be a cylinder suspended in the heavens.

Guides for Global War

By Captain F. I. Burnham

MAPS AND REPRODUCTION UNIT, A-2

Maps and charts are essential tools for the proper execution of modern combat, and aerial cartography is a new development of profound importance.

NEVER in world history have maps and charts been so important. In this global war they are vital to airmen.

Primitive man drew maps with sticks on the ground to illustrate his direction of travel and the principal objects to be encountered. The early mariner charted the coasts of familiar lands so that he might sail and return safely.

Today a complex system of maps enables the aerial navigator to plot his courses and readily recognize features of the terrain over which he flies. Not only can he locate places by their horizontal characteristics, but he also can avoid vertical obstructions, such as mountains or other hazards protruding from the earth's surface.

An outline of the principles of cartography, both historical and constructive, is one deserving more attention in this air-minded age. Several million dollars worth of maps are published every year in this country, but we still are not map conscious when compared with most of the nations of Europe.

A critical comparison of maps produced in the United States with the maps produced, say, in Germany or Italy, indicates we are still amateurs in the science. We should, therefore, know our maps better and strive to improve the results of our cartographic efforts.

We know that maps have been in use at least since the time of Homer (about 900 B. C.). These maps now have only historical value but from this humble start evolved the accurate maps we use today. In looking back to historical maps preserved for our study, we see the earth shown as a disk encircled by a great river, Oceanus. The people of Homer's time thought of the earth as such a disk turned up at the horizon like a huge saucer. Later, as extensive commerce and the founding of colonies became more common, geographical knowledge became more accessible to the masses.

To Aristotle (384-322 B. C.) is given the distinction of founding scientific geography when he explained his theory of the spherical earth, taken, it is said, from ideas of the ancient philosophers.

Mathematical geography followed about 160 B. C. (Hipparchus). These attempts at the formation of the cartographical and geographical sciences were solidified by Ptolemy, the "father of geography," as we are bound to call him after a study of his great work "Geographia."

PTOLEMY (150 A. D.) produced twenty-six maps to illustrate his *Geography*, drawing largely upon the previous work of Marinus, and showing early representations of the continent of Europe. The principles underlying the Ptolemaic conceptions of cartography are described in the accompanying article.

After Ptolemy we lose sight of any concerted effort at constructive map-making until the improved charts now known as the "Portolan Charts" began to make their appearance about 1300 A.D. These were products of the early Italian and Catalan chart makers. Another great impetus was given to maps and charts through the world travels of Marco Polo and the increasing trade with the east.

With the invention of printing in the fifteenth century, and proof that the world was a sphere through the voyages of Columbus and Magellan, our modern cartography really began to assume a definite pattern.

By the end of the eighteenth century the map was truly a work of art, with much of its surface taken up with ornamental drawings and embellishments used not alone for art's sake but to fill up the blank spaces of geographic ignorance.

To those of us who think in terms of travel and combat by air, maps should be easily understood. A map is nothing more than a generalized picture of the earth as we see it from above.

But a map—to define it more exactly—is a graphic representation of a portion of the surface of the earth, or even of the whole globe, on a plane surface, usually with a high degree of generalization and simplification according to its scale, and often with the addition of data of some special subject matter.

In the early stages of map making, the representation of physical features was purely local in character. The remoteness and differences of language made its universal usage an almost impossible barrier. As international communications developed, however, there was a gradual overlapping of ideas. Many of our present signs and symbols have been arrived at by international agreement, thereby making the principal features of a map an almost universal language.

If a book is to be read, we must know the language in which it is written. This is not true of a map. It little matters if a map be published in Russian or Japanese; because we can see at a glance the principal features, the location and relation of cities to each other, and the principal geographic configurations of the country. And, if the scale is sufficient, the relationships of the major political areas are immediately apparent.

For maps to be used to the best advantage, they should be classified in two groups: general purpose maps and special purpose maps.

The first group, general purpose maps, includes world political maps to show world relationship, continent maps to illustrate the relationship of countries within a unit, and state and county maps for more detailed study. Then there is the popular newspaper map, which may properly be called a political or informative map designed for general use by a greater number of people than are the special maps.

The second group, special purpose maps, is almost endless in its variety and scope. Only the major types will be described here.

The hydrographic or nautical chart, which has played such an indispensable part in the development of nations, embodies technical knowledge in which mathematical science of various kinds has been reduced to the minimum necessary for the comprehension of the mariner.

There is this distinction between the nautical chart and maps in general: while the latter may serve as a reference medium, the nautical chart—in its special and accurate delineation—is an instrument to be worked upon so that a ship's course may be laid off with accuracy and ease and positions readily determined; it must present information in detail, yet with simplicity; it must be up to date with data on a nation's ports and commerce, and it must help the navigator avoid the destruction of life and property.

Aeronautical charts constitute a practically new development in cartography; their primary object is to provide the needs of the airman in as simple and characteristic a form as possible. These needs include his ready solution of certain problems of direction and distance and a comprehension of intervening terrain at a glance. The features to be stressed are those relevant to his purpose. The airway route must be clearly defined, and prominent landmarks, whether natural or otherwise conspicuous, must be clearly shown or emphasized. These landmarks should include the general trend of railways and highways, their intersections, and industrial positions.

Sinuosities of streams should be generalized; minor roads and other detail that may confuse the flyer should be omitted. Simplicity is desired so that the airman may grasp at a glance the relative location of the places in which he is interested and which will serve him in maintaining his course. Special emphasis through the use of color or prominent landmarks, and the additional use of color for gradients of elevation, serve as a ready means for securing position and orientation.

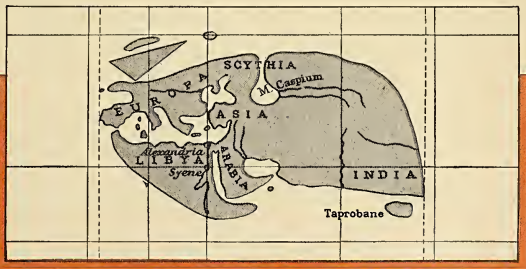
The Weather Bureau performs a systematic and continuous service for agriculture and commerce and for marine and aerial navigation. Through the medium of the telegraph, radio and other forms of communication from various stations, supplemented by reports from other countries and ships at sea, weather maps and other meteorological data become an important adjunct in the use of charts, especially in the maritime interests and in aeronautical development.

Weather maps, based upon simultaneous observation taken at many places, are issued daily in the United States at the various Weather Bureau offices. In addition, manuscript maps, covering the United States in two sections, are issued at the airway stations for every six-hour period. The bureau also enters various data to show progressive changes in weather conditions from day to day and from month to month on Northern Hemisphere maps.

Other special purpose maps include economic maps used to show resources of countries and their transportation systems; geological maps to plot and describe conditions that are of vital interest to engineers, and soil maps to enable the farmer to utilize his land to the greatest extent.

This paper purposely omits the description of a map that should rank high in the order of special maps, namely, the military map. The subject of military maps, generally divided into strategic and tactical, and the recent development of target charts, will be the subject of a succeeding article. ☆

HERODOTUS of Halicarnassus, who thrived between 484-425 B.C., drew this conception of the world, showing three continents. Note the fairly accurate manner in which the Mediterranean area was represented.



ERATOSTHENES (Circa 200 B. C.) depicted the world in the shape of a parallelogram, without much regard for coast-line details. Little was known of the continent of Africa; therefore it was largely ignored.

BAPTISM OF FIRE

(Continued from Page 17)

so I could follow it down. I saw a brown streamlined shape fall away from us and plunge into the water just short of the target. Closing the bomb doors, I called the pilot.

"Everything O.K., sir. Just short of the target."

The flight continued. We maintained a rather large echelon formation. We passed the island of Amchitka.

I thought, "Oh, Oh! I'd better keep my eyes open around here."

I checked everything over again. My heart beat a little faster. I felt warm. I kept wondering if I was going to be afraid.

The atmosphere had a peculiar leaden grey hue, though visibility was good. The sky had a high overcast and the water was a dull grey color. We ran into scattered showers, very small.

The pilot spoke, "We're almost there."

To our front, in the far distance, I saw a group of three airplanes. I wondered if they were friendly or enemy.

We came close enough to see they were the other flight. Our formations joined. We could see Kiska Island, very obscured by mist.

My left hand froze on the bomb door control, my right on the gun. I started breathing faster. "Gee, I must be scared," I thought.

We turned left, flew for quite a distance in a large circle to the right. The formation circled, started back the opposite way.

Suddenly, on the far horizon—two ships!

The pilot called, "Everybody ready?" The crew answered, one at a time, in tense voices, "Ready, sir."

The formation turned to the left and broke into two groups of three, then spread out. We got closer and closer, started circling, like a tribe of Comanche Indians closing in on a wagon train.

Suddenly, sheet lightning darted away from the dark, formidable, grey shapes in the distance. Water spouted on our right. Dirty looking balls of black smoke suddenly appeared on our right front, in ever increasing numbers.

My heart was pounding furiously, my breath was coming hard. I felt hard and tensed up in every muscle. My right hand froze to my nose gun.

We turned around, putting our formation in the lead, and started circling in the opposite direction. The pilot called:

"Everybody ready! This is it! Good luck and give 'em hell!"

The turret gunner: "Good luck, everybody. Give 'em hell!"

The tail gunner: "Good luck, everybody!"

More and more of those deadly looking puffs of black smoke appeared, much too close for our peace of mind. Great flashes continued to dart from the ships.

Our formation wheeled to the left, started to close in, weaving and bobbing like boxers in an arena, continually changing speed, course, altitude.

I opened the bomb doors. I struggled to turn my head away from the scene long enough to see the bomb door light.

The light went on. I shoved the control lever into "Selective."

Varying our altitude from fifteen to fifty feet, dodging, bobbing, skidding, we closed in like a pack of hungry wolves.

We were the right wing ship of the lead formation. Captain Salter's plane was in front of us and to our left. While firing into the deck of the smaller destroyer, I saw his plane, like a monstrous black bird, rise over the stern of the destroyer to our left and sew bombs like planting corn, right up the center of the ship from stern to bow. The superstructure started to explode violently, erupting flame.

We were almost on our target. I ran out of ammunition. Suddenly the other destroyer loomed up in my face. Quickly, I called the pilot—"Hold it!" I toggled three times. "Bombs away! Let's get out of here!"

I LEANED over and followed the bombs down. The first hit just forward of the stern, at the water line, and the other hit further forward, on top of the deck. I could only see two bombs hit. Closing the bomb bay, I glanced at the indicator lights. Three bombs left! I called the gunner.

"Melvin, take a look at those bombs and see what's wrong. I only dropped two."

"Roger," he answered.

The pilot called, "Everybody O.K.?"

"Gardner, O.K."

"Hanson, O.K."

"Where's Melvin?"

"He's in the bomb bay, checking the bombs, sir. We only dropped two!"

Melvin called, "Gardner, they look O.K. to me."

"Roger," I answered.

We swung out and away. I looked around the horizon. The first of the two destroyers to be hit was shooting huge spouts of flame and smoke. An explosion occurred almost every ten seconds. We started carrying on a joyous, if somewhat profane, conversation over the interphone.

I looked at the second ship. It was wallowing in the ground swell, stern low in the water. Black smoke was pouring from its stern.

We cruised around the remains of the two ships. Obviously one was sinking rapidly, the other severely damaged.

I could only see three other planes in the air besides ours. I called Melvin.

"Melvin did they get two of our planes?"

"They got one," he answered, "I saw it go down."

"Damn!"

Lieutenant Maurer called, "Gardner, get ready. We're going to make another run and get rid of these three bombs." We turned, started coming in again. I had reloaded my gun and had another ammo can ready. I glanced at the remaining destroyer and saw they were firing at us with the big guns from the forward turrets. Smoke continued to pour from the stern.

We swung around and headed straight for the bow of the ship, maintaining evasive action. Puffs of smoke kept appearing in our vicinity, ever closer.

We had come within shooting range of the ship. I fired my nose gun, following the tracer into the foredeck of the target.

I opened the bomb doors, maintaining fire with my right hand. The ammunition ran out. Quickly, I swung my gun over, yanked out the empty can and shoved another into place. I pushed the control lever into "Selective." I fed ammunition into the feedway of the gun, slammed the cover down and started shooting again. By this time, we were almost at the ship.

I grabbed the gun with my left hand, dropped my right hand to the toggle switch. The pilot straightened out and I toggled about ten times, still firing. The ammunition ran out again, just as we passed over the bow of the destroyer. Horrified, I saw tracers and "pom-pom" coming at us. We had to climb quickly to avoid ramming the mast. I saw a gaping hole in the stern, smoke pouring out. I yanked the bomb doors closed. The aft guns were not firing.

There was a trail of tiny figures in the water, a few clinging to wreckage. In the distance, against a murky grey sky, dense black smoke and pillars of flame erupted from the remains of the first destroyer.

I glanced at the indicator lights. My heart sank! There were still three bombs left. I notified the pilot.

We circled the vicinity a little while longer. One other plane was still with us. We started home, the plane undamaged.

We came in over the field at dusk, circled, and landed. We taxied over to the other planes and parked.

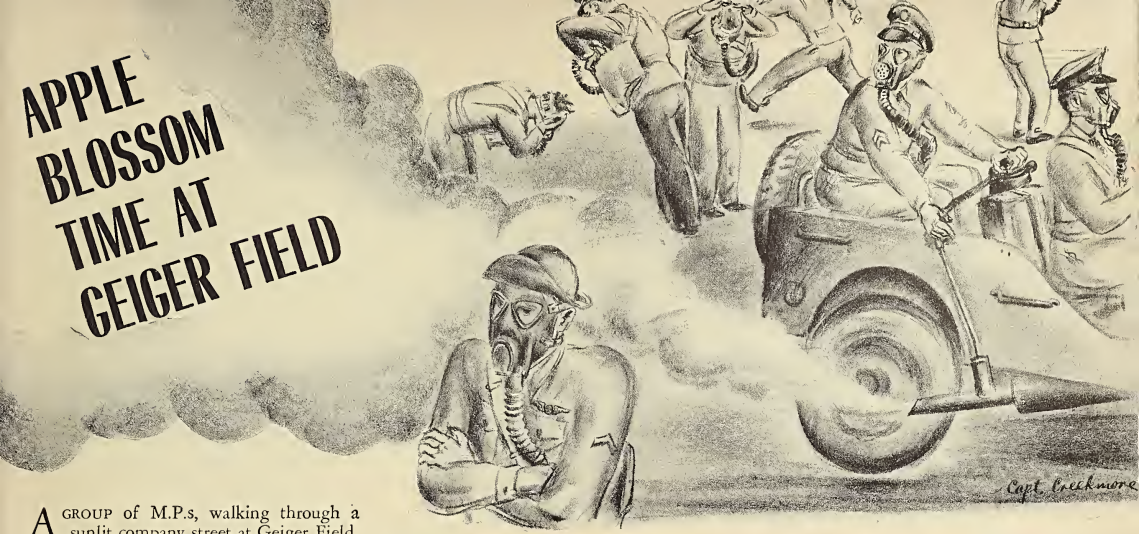
I jumped out of the plane, bent over and patted the ground, my knees still weak from excitement. It was sure good to be alive.

IN THE YEARS to come, I'll think back to the scene of that battle; I'll remember the most perfect bombing run I ever saw, actual or practice. Captain Salter and Lieutenant Patillo and their crew deserve a great deal of credit for the remarkable attack they made on that destroyer.

I'll remember that some of this organization's finest men went down that day and the mission before that, their lives lost in an effort to stamp out the most verminous species to ever inhabit our earth.

I'll remember that I'm living on borrowed time. The extension was granted to me by the skill of my pilot, Lieutenant Maurer, whose excellent flying brought the entire crew out without a scratch. ☆

APPLE BLOSSOM TIME AT GEIGER FIELD



A GROUP of M.P.s, walking through a sunlit company street at Geiger Field, Washington, are having a good cry. All the men are obviously choked up. Tears sluice down their cheeks as each soldier dabs a handkerchief to his reddened eyes.

The fact is, these men have been gassed. But *good*. Lieutenant S. F. Eldridge who is known, as Chemical Warfare officers everywhere are known, as Stinky—plays for keeps on Gas Drill Day. When he says "Alert," he means "Alert," and if you mistake his meaning and are not prepared to whip on your mask in a hurry, you will get a man-sized waft of tear gas.

Lieutenant Eldridge, on his weekly Gas Day, drives a jeep. He drives it with the concentrated frenzy of Popeye the Sailor. Strapped on the jeep is a cylinder of tear gas and holding a spray nozzle at the "Ready" is one of Eldridge's cohorts. Very adept at this work, he can spray you in all sorts of ways, even "by the numbers."

Up and down company streets, into workshops and hangars they go, stampeding those who have forgotten their gas masks, or who cannot put them on quickly enough, or who, at the critical moment, find they have strapped them *under* their coats.

RANK, in this realistic drill, means nothing. On the very first Gas Drill Day, the sanctum of Geiger Field's commanding officer, Colonel William G. Schauffler, Jr., was invaded.

In fact, the whole thing is Colonel Schauffler's idea.

The Colonel, a flyer, got a touch of gas in the last war through his own admitted neglect. On another occasion he was piloting an open cockpit plane in infantry contact work when a gas attack came and was lucky to have a mask with him.

Because of his own experiences, Colonel Schauffler swore that should he ever take part in a war again his men would be thoroughly trained in gas mask use.

They are. Every Tuesday is Gas Alert Day. Every man on the field must go about his ordinary duties prepared to don his mask and continue working just as he would have to do in a combat area under real attack.

Each Tuesday Lieutenant Eldridge and others of the Chemical Warfare section patrol the field with their tear gas apparatus and are the Professors who play sad music with the hose on all who are neglectful. This gives dramatic training, with no loss of time whatever.

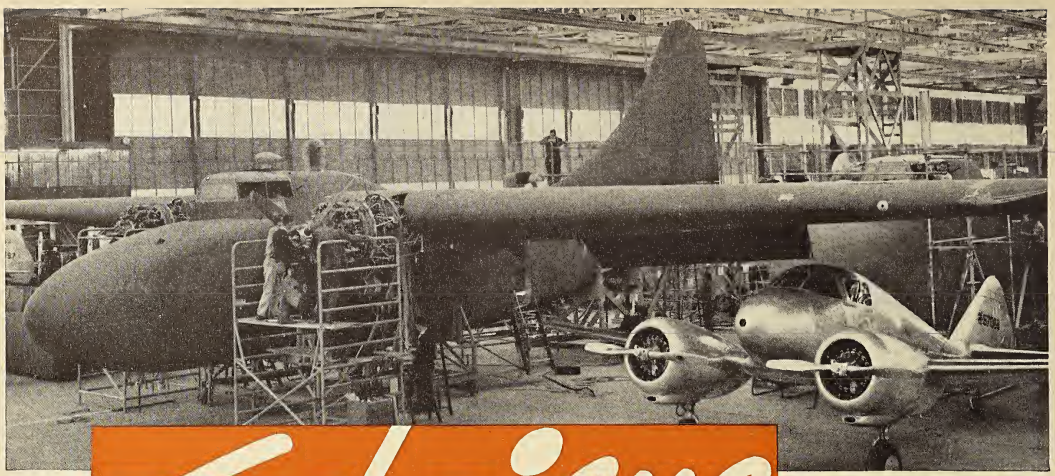
To date, only tear gas (or CNB) has been used. This has little odor. What odor it has is something like the "apple blossom" scent of a similar but stronger gas, CN.

But Geiger Field (attention, men) has been promised an even more dramatic drill. That will be the day Lieutenant Eldridge trots out the "puking gas." Ugh.☆

CHEMICAL WARFARE POCKET REFERENCE CARD

Class		Agent	Odor	Color and State in Field	Persistency	Immediate Symptoms	Protection	Field First Aid
Casualty Agents	Lung Irritants	Chlorine	Highly pungent	Heavy yellow-green gas	1 to 5 min.	Irritates lungs	Gas Mask	Remove from gassed area. Loosen clothing. Keep warm and quiet. Give non-alcoholic stimulant. Treat for shock and pneumonia. Stretcher case.
		Phosgene	Fresh hay Ensilage	Colorless gas	1 to 10 min.	Burns throat, eyes Choking & coughing		
		Chlorpicrin	Chloroform Sweet	Colorless gas	1 to 15 hours	Irritates nose and throat. Vomiting.		
	Vesicants	Mustard	Horse-radish	Liquid and colorless vapor	3 to 20 days	Irritates lungs. Delayed blisters.	Gas Mask & Protective cloth-ing.	Remove from area. Soak up excess agent. Remove contaminated clothing. Wash skin with soap and water or kerosene. Rinse eyes with boric acid solution. Keep warm. Treat as lung-irritant patient.
		Lewisite	Geraniums	Liquid and colorless vapor	1 to 7 days	Burns eyes, lungs, skin. Blisters.		
		Ethyl-Dichlorarsine	Biting, irritant	Liquid and colorless vapor	1 to 12 hours	Sneezing, crying, vomiting.		
Harassing Agents	Lacrimators	Chloraceto-phenone	Apple blossoms	Colorless gas	10 min.	Skin and eye irritation. Crying.	Gas Mask	Do not rub eyes. Remove to pure air. Face the wind.
		Chloraceto-phenone- -Sol	Sweetish	Liquid and colorless vapor	1 to 50 hours	Eye, skin irritation. Vomiting.		
		Chloraceto-phenone—Sol	Sweetish	Liquid and colorless vapor	1 to 50 hours	Eye and skin irritation.		
		Brombenzyl Cyanide	Sour fruit	Liquid and colorless vapor	2 to 14 days	Eye and nose irritation.		
	Irritant Smokes	Adamsite	Coal smoke	Yellow smoke	10 min.	Headache, nausea, violent sneezing.	Best type filter in mask	Remove to pure air. Keep quiet. Sniff chlorine from bleaching powder bottle. Keep warm.
		Diphenyl-Chlorarsine	Shoe polish	White-gray cloud or smoke	10 min.	Temporary mental oepression.		
Screening Smokes		White Phosphorus	Burning matches	White smoke	10 min.	Solid particles burn skin.	Avoid particles	Put under water. Pick out particles. Do not apply salve or grease.
		HC Mixture	Sharp acrid	Gray smoke	While burning	Harmless	None	None.
		FM Mixture	Mild acrid	White smoke	10 min.	Harmless	None	None.
		FS Mixture	Burning matches	Dense white smoke	5 to 10 min.	Irritates skin.	None	Wash.
		Crude Oil	Burning oil	Dense black smoke	Depends on wind	Harmless	None	None.
Incendiaries		Thermit		White smoke, red flame	5 min.	Burns	Water & sand	Cool incendiary material on or in skin by flooding with water. Do not apply salve or grease.
		Magnesium		White smoke, white flame	5 min.	Burns	Water & sand	
		Gasoline-Rubber	Burning rubber	Smoky red flame	5 min.	Burns	Water & sand	

The above chart necessarily omits color markings and symbols which identify the various devices and equipment used with each chemical agent. Casualty agents are identified by green markings; harrassing agents by red; screening smokes by yellow and incendiaries by blue. Each mark is accompanied by bands of color which indicate the persistency of the gas. The above card, carrying on its reverse side instructions on the use of the gas mask, is distributed by the Air Service Command.



Technique

A Monthly Review of Technical Developments in the Air Forces

Above is a view of the Curtiss Caravan, the new all-purpose cargo carrier made of wood which is now going into quantity production. This sky giant is designated as the C-76.

First Wooden Transport

THE ARMY AIR FORCES has a new, virtually all-wood cargo plane. It is the giant Curtiss Caravan, officially designated the C-76.

The Caravan is a high-wing monoplane with a span of 108 feet, is 68 feet long and is powered by two 1,200-horsepower engines. It is equipped with retractable tricycle landing gear and is built so that its floor is only 36 inches from the ground, thus making possible rapid loading and unloading of cargo. It has a low landing and stalling speed, short take-off performance and moderate range and cruising speed. Its characteristics make it unusually suitable for operation in areas where there are few facilities for repairing metal planes, and where landing fields are small and operating conditions difficult.

The control compartment of the new plane is situated above the forward section of the cargo space and accommodates a crew of pilot and co-pilot, also offering provisions for a radio operator when desired. The cargo section carries a cable to which the release cord of a paratrooper's parachute may be attached, and each plane can be equipped with fittings for towing gliders.

Woods used in the production of the Caravan are hickory, spruce, birch, gum, mahogany and Douglas fir. The plywood ranges from three-ply, used in the construction of the leading edges, to nine-ply, employed in the center panel. The wings are of the conventional two-spar, box type construction. The wing spars are of laminated spruce cap strips, with plywood webs, internal diaphragms and stiffeners. The fuselage is of semi-monocoque construction.

The C-76 will be built by a new Kentucky plant of the Curtiss-Wright Corporation and by the Higgins Shipbuilding Co. Sixty-five percent of its construction will be subcontracted to the wood industry, thus not interfering with the manufacture of combat airplanes. The major subcontractors are the Mengel Company of Kentucky, the Baldwin Piano Company of Ohio and the Universal Molded Products Co. of Virginia.

The design of the Caravan was conceived by Curtiss Wright engineers, working in conjunction with the Army Air Forces, early in 1942. The manufacturing project was begun in March of that year. C-76s, until the new Kentucky plant is ready, are being built in Curtiss-Wright's Missouri factory.

New Crash Finder

REACHING crashed planes quickly is no longer a problem at Mather Field, California, where Captain LeRoy G. Heston, station engineer and accident officer, has equipped a jeep with a radio for two-way communication with a scout plane. When a crash occurs, the plane acts as the eyes of the pair, and the jeep, which can traverse almost any kind of terrain, is directed promptly to the scene. Above, Captain Heston and Lieutenant Roy P. Sampson, post signal officer, are shown in communication with the scout plane.

Dual-Rotating Propellers

By C. I. Valentine

Propeller Laboratory, Wright Field

The Army Air Forces has an extensive development and test program under way for the design and construction of dual-rotation propellers for use with engines of increased horsepowers and for high altitude operation. This experimentation was begun several years ago when the Air Forces first visualized the necessity for the development of a propeller arrangement in which two separate controllable pitch assemblies were installed, one in front of the other.

The standard dual-rotation propeller is assembled on two concentric shafts turning in opposite directions. The number of blades is always given as the total involved; a six-blade dual-rotation propeller consists of two three-blade sub-assemblies.

There are a number of advantages gained by the use of dual-rotation propellers: (1) The availability of a greater number of blades than is normally feasible, (2) an increase in propeller efficiency under flight conditions requiring high blade angles, and (3) elimination of torque reaction.

The availability of a large number of blades is advantageous because, with the higher powers and greater altitudes now being encountered, sufficient blade area must be available to absorb the added power at efficient angles. Improved take-off and climb characteristics are obtained in addition to increased speeds and ceilings. The additional blades also permit smaller propeller diameters, thus allowing use of a shorter landing gear while maintaining necessary ground clearance for blade tips.

With the single rotation propeller now in general use, an airplane tends to roll in the direction opposite that of the propeller rotation. This is torque reaction. On single-engine fighters this tendency is of considerable magnitude, particularly at low speeds and high power, such as during take-offs and approaches for landings. For normal flight the airplane control surfaces are given a fixed adjustment (called "trim") to balance against the propeller torque. But only one value of propeller torque is balanced for each speed, thus causing the pilot to change manually the trim adjustment when necessary. The dual-rotation propeller, dividing the power equally and turning in opposite directions, eliminates the torque reaction automatically for all conditions of engine power and speed.

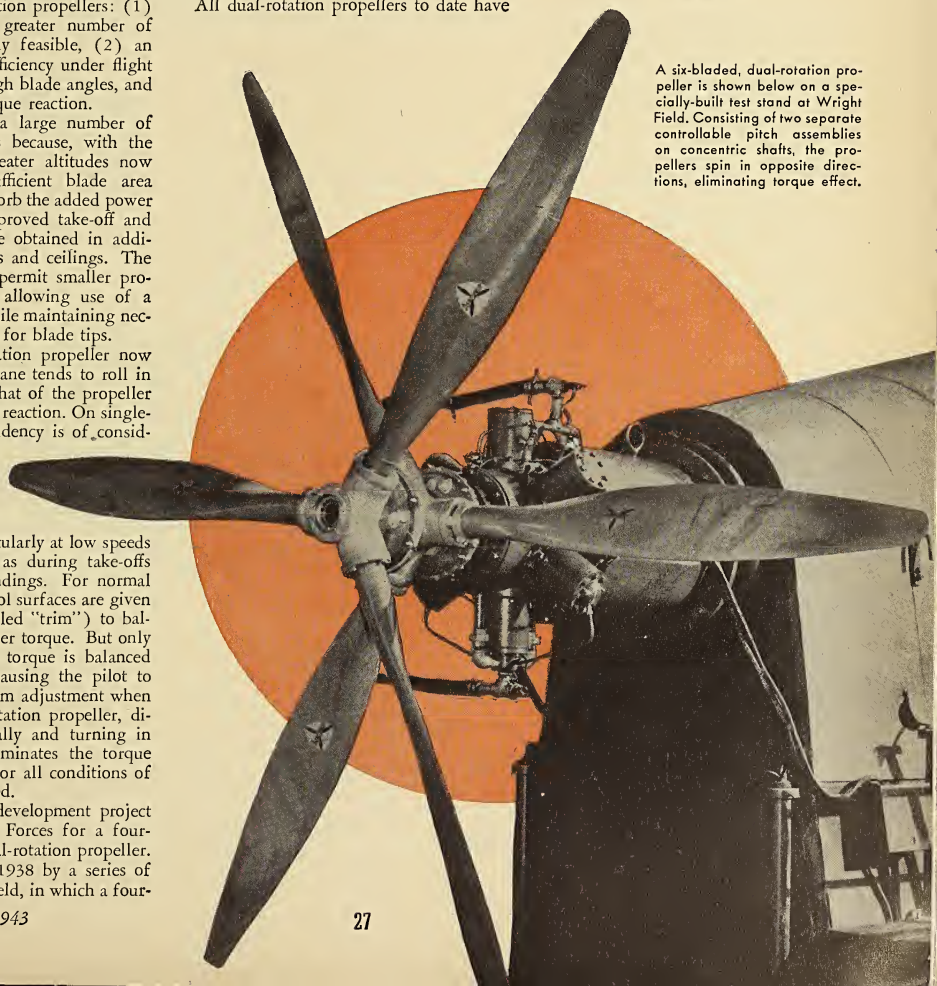
As early as 1936 a development project was begun by the Air Forces for a four-bladed, controllable dual-rotation propeller. This was followed in 1938 by a series of flight tests at Wright Field, in which a four-bladed, dual-rotation propeller was used on a single-engine plane. Control of the plane during maneuvers was noticeably easier than with a single-rotation propeller and there was no tendency to roll even with full application of power and with all control surfaces in neutral positions.

About two years ago it was possible to know definitely for what type of airplanes and engines the development of dual-rotation propellers should be undertaken. The Air Forces at that time initiated development projects for six-bladed, dual-rotation propellers with three major manufacturers: Aeroproducts, Curtiss and Hamilton Standard. These propellers are for use primarily on fighter planes utilizing engines in the higher horsepower class.

All dual-rotation propellers to date have been designed to operate with the two sub-assemblies turning at equal speeds in opposite directions. This is considered standard. Engine nose and propeller shaft standards have been established and are being used so that a propeller of any manufacturer's design can be installed on any suitable engine. Blade designs identical to those for single-rotation propellers are used except that both right-hand and left-hand blades are required for each propeller.

Dual-rotation propellers are not considered unduly complicated and are no more difficult to handle than a single-rotation propeller. They involve a weight increase of only about ten percent above the weight of two corresponding single-rotation propellers. The problem of synchronizing machine gun fire through dual-propeller discs is not difficult since, by controlling the position of blade passage, as many openings can be made to occur at a given location with dual-rotation propellers as with a single-rotation propeller.

(Continued)

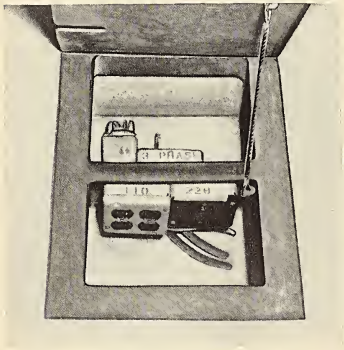


A six-bladed, dual-rotation propeller is shown below on a specially-built test stand at Wright Field. Consisting of two separate controllable pitch assemblies on concentric shafts, the propellers spin in opposite directions, eliminating torque effect.

Major Orcutt Again

MAJOR LESTER G. ORCUTT, Sub-Depot Commander, Hunter Field, Georgia, inventor of the inexpensive bombsight and bomb rack described in the last issue of AIR FORCE, has done it again. His new inventions are a field lighting unit for night maintenance and an anchor stake for tying planes in sandy soil. Both of these devices were developed while Major Orcutt was stationed at Morrison Field, Florida.

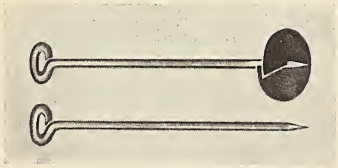
The purpose of the field lighting unit is to provide an electrical connection that cannot be broken when heavy bombers, trucks or tractors run over it. The unit consists of a sunken iron box containing eight plugs and a light that automatically flashes on when the lid is opened. The entire assembly is installed flush with the ground on a two-inch grade of concrete. Holes cut in the lid, which is constructed of one-fourth inch cold rolled iron, leave ample space for power leads when the box is closed. A



Lighting unit—open

drain pipe is also connected which carries away any water that might accumulate.

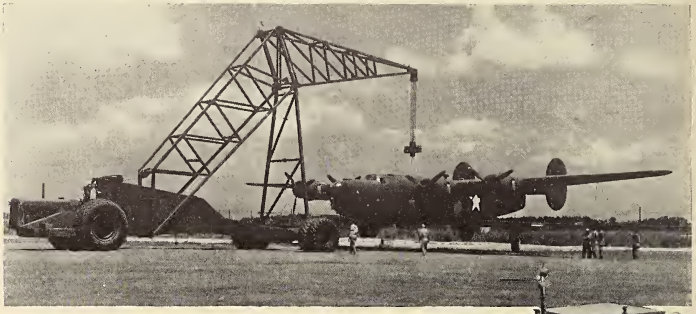
The new stake consists of a standard anchor stake with a six-inch steel plate one-eighth of an inch thick, welded near the bottom. The plate is shaped like a corkscrew with the leading edge sharpened, permitting it to be screwed into the ground. Even in sandy soil the stake has proved unusually stable. Tests show it cannot be pulled out even by a two and a half ton



Top is the new stake, and below, the old

truck that could extricate six old-type stakes with little effort. Only a few of the new stakes are needed to anchor a four-engined bomber—a job that takes from twelve to fourteen of the old type.

This is the Fairchild AT-14, new five-man aircrew trainer. It is made almost entirely of plastic bonded plywood, formed by the Duramold process. The plane has a speed of over 200 M.P.H., can carry a useful load of almost two tons and is powered by two Ranger in-line air-cooled 12-cylinder engines.



Big and Little

HERE are the big and little of the ground forces machines that keep 'em flying. A new giant crane recently developed by Wright Field engineers is shown above lifting a B-24 with ease. The crane weighs over 130,000 pounds, is self-propelled by a 200-horsepower Diesel engine, and can move disabled planes at a top speed of eighteen miles an hour. The front wheels, over eight feet in diameter, give some idea of its size. At right is the Air Forces' stand-

ard three-wheel motor scooter, used by stock chasers and messengers at virtually all air bases. The box in front carries about 400 pounds. The one-cylinder motor has a top speed of around thirty miles an hour and travels seventy miles on a gallon of gas.

Radio-Code Machine

DOWN at the Enid, Oklahoma, Flying School they have a new automatic radio-code machine that can transmit six different messages at different speeds among 220 students, all at the same time.

The machine, which is really a combination of six separate transmitters set up on an elaborate rack, was provided by radio station KCRC of Enid. It was obtained through the efforts of Instructors Lieutenant Chester E. Goddard and Mr. William B. Teitzel, former radio engineer at KCRC.

When the machine is in operation, the code is imprinted on a tape by a printing stylus in much the same manner as a barograph recorder. The tape passes over a photo-electric cell directly beneath a focused beam of light. As the light passes through that portion of the tape on which the code is printed (a long space of light is a dash; a short space a dot) into the photo-electric cell, a small amount of current is generated—sufficient to energize the mechanical sender to transmit the code to 220 pairs of earphones.

Since the new machine was installed, students at Enid (above, in class), have increased their reception speed from six to between seven and eight words per minute.

(Continued from Page 14)

to restrict the fluids lost by sweating. Because water consumed rapidly is thrown off in excessive perspiration, it is well to form the habits of drinking small amounts of water slowly, of moistening the mouth and throat frequently with sips of water, and of refraining from drinking as much as possible.

Because salt is lost from the body with perspiration, it is necessary to supply additional salt either in the form of salt tablets or by adding it to the food. Otherwise heat cramps, and possibly heat exhaustion, result.

There are certain definite precautions with regard to foods that should be observed at all times. Native fruits and vegetables are frequently dangerous, either because they have been fertilized with human waste, or because they have been washed in polluted streams. In order to be sure that they are safe, they should be dipped in boiling water for a few minutes before being peeled. Potassium permanganate solution is not satisfactory unless the fruit or vegetable is allowed to soak in it for a minimum of four or five hours.

All foods, other than thick-skinned fruits, should be thoroughly cooked. Do not eat the smoked or raw fish that the natives relish because frequently sea foods are contaminated by tapeworm and flukes. As a general rule, food which monkeys eat is not poisonous to humans if properly prepared.

Because food spoils rapidly in this area, it is necessary to carry such staple food as concentrated rations, canned fruit juices, crackers and thick-skinned fruits when going out on an operational flight.

Before sampling a strange food, make inquiry about it, for although the majority of native fruits and vegetables are safe, some are poisonous. Certain species of fish are edible in one part of the islands, but become poisonous when they migrate to other waters during the spawning season. In some of the more primitive areas, poisoned foods are placed near the family burying grounds, for the natives believe that whoever partakes of this food will proceed to heaven and become a servant of the recently departed relative.

Sulfaguanidine, a part of the jungle kit, may be taken should diarrhea or dysentery develop. Seven tablets dissolved in water should be taken every four hours until there are no more than five bowel movements per day. Then the dose should be repeated every eight hours until bowels return to normal.

It generally is necessary to supplement an army diet with vitamins. This may be done by taking vitamin tablets, cod-liver oil, beer, or any quartermaster issue for this purpose.

The fungus diseases, although not usually fatal, can lead to such distress that they prohibit a man from being an effective part of a fighting team. The cardinal points in avoiding these are: frequent bathing; thorough drying of all parts of the body, especially between the toes, the groin and under the arms; dusting all parts of the body with powder, such as the army issue foot powder; and changing to dry clothing as often as possible. Never walk about barefoot, even in barracks or in the shower. A pair of bath slippers may be made of a piece of wood and some string. This will protect you from athlete's foot. Be sure that the clothing of a man suffering from a fungus disease is not washed with yours, unless boiled, for this is a common method of transmission. And above all, do not use other people's towels or allow others to use yours.

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Tips On Forced Landings In The Southwest Pacific

Chances of surviving a forced landing in the Southwest Pacific theater of operations are enhanced if you know as much as possible about the geography of the many islands, the rainfall, winds, ocean currents, plants, animals and the characteristics of the people.

When forced to bail out at night, don't start looking for an "out" from your predicament as soon as you have your feet on the ground. Wait until morning and travel in the direction of the coast; walk downstream or downhill. If you reach a river you may be able to build a raft of logs and float to the sea.

Observe jungle birds and animals to determine edible roots and herbs. What they eat is usually safe for you. Protect yourself from exposure and insects by utilizing all clothing available, including your parachute. Rest frequently. Dry your clothes when they become wet. Seek out dry places to sleep. Motor oil may be used as an insect repellent and as a fuel.

Travel on the up-wind side of swamps and rivers. Part of your 'chute may be used to collect rainwater, which is preferable to ground water if you have no means of purification.

After reaching the coast, if you do not know your approximate location and are becoming exhausted, improvise a signal device and await rescue, rather than expend your failing strength by attempting to travel.

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In certain parts of the islands, crocodiles abound in the larger streams and make bathing a hazardous undertaking. However, if the bath is taken in a partially submerged stout box anchored several feet from shore, this danger may be avoided. Some of the natives believe that the crocodile is a divine being and that when one is killed its mate will retaliate by devouring a man. Out of respect for this superstition, crocodiles are rarely shot without first obtaining the permission of the natives. The only vulnerable part of a crocodile is his eyes. If attacked by a crocodile while bathing, by pressing one or both thumbs deeply into the crocodile's eyes he may be made to relinquish his hold. A crocodile may be killed by stabbing through the eyes into his small brain with a sharp instrument.

Leeches are obnoxious pests in the low-lying district of this area. The large dark horse leech is found in fresh water and the small red jungle leech is found on shrubs and jungle grass. The leech bite itself is not dangerous. However, the site of the bite frequently becomes infected and leads to a painful chronic ulcer. This is especially apt to happen if the leech is pulled off, for then it leaves its "stinger" in the wound. When traveling through the jungle, natives carry small sacks of moist salt tied on the end of a stick. They remove the leech by the simple process of touching it with this salt sack. They also will fall off if prodded with a knife or if touched with a lighted cigarette.

The Argus, a small insect similar to our sandfly, is very prevalent. It attacks any part of the body which is exposed, leaving a swollen and painful bite. An immunity to the poison is soon developed in the body, eliminating the swelling, but the bite is always painful. These insects are probably the most common and disagreeable pests found on islands of the Southwestern Pacific.

A heavy service shoe well hobnailed, extending above the ankle, is most suitable for the East Indian area. Boots are too heavy and too hot, but the paratrooper's shoe is excellently adapted to this country. Extra hobnails should always be carried, and clothing should be inspected for poisonous insects before being put on. Centipedes, in particular, like to hide in folded clothing.

Because of the difficulty in keeping clean and dry, minor wounds, such as leech bites, insect bites, scratches, cuts and burns, which would be of little consequence in the United States, become infected easily in this area. No matter how small or trivial, all wounds should be thoroughly cleansed and an antiseptic applied to them immediately.

Venereal diseases are prevalent among the people who live along the seacoast and on the lower reaches of the large rivers. Many of the women in these areas are promiscuous, and both professional prostitutes and clandestine pick-ups are frequently encountered. The great majority of these women have gonorrhea and syphilis, while chancroid is not uncommon. In the remote upland district, there are few venereal contacts and venereal diseases are less prevalent. The tribesmen in these remote areas place great value on chastity and will go to extremes to revenge the violation of one of their women.

It takes from three to four months for troops to become acclimatized to the Southwestern Pacific. After this time the climate will be well tolerated if proper health precautions are taken. ☆

ROLL of H

CONGRESSIONAL MEDAL OF HONOR

LIEUTENANT Harl Pease, Jr.*

DISTINGUISHED SERVICE CROSS

COLONEL W. O. Eareckson. **LIEUTENANT COLONELS:** Brooke E. Allen, Loren B. Hillsinger, William C. G. Hipps (Also Purple Heart). **CAPTAINS:** Jack Adams (Also Silver Star), Charlie Falletta. **LIEUTENANTS:** Frank E. Adkins, Robert B. Burleson, Christian I. Herron*, L. D. Landry*, Henry J. Rose (Also Silver Star and Oak Leaf Cluster to Silver Star), Leland A. Walker, Jr. (Also Silver Star), Donald A. Walter*. **FIRST SERGEANT** Robert R. Davis. **SERGEANT** James L. Cannon*. **CORPORAL** Andrew J. Swain.

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SILVER STAR

LIEUTENANT GENERAL George H. Brett. **MAJOR GENERAL** George C. Kenney (Also Purple Heart). **COLONELS:** John S. Allard, Lauri S. Norstad. **LIEUTENANT COLONEL** John Hubert Davies. **MAJORS:** Gordon A. Blake, John F. Devos, Edward F. Rector, John A. Rouse (Also Purple Heart), William A. Sheppard, Harold N. Willsie*. **CAPTAINS:** Harry N. Brandon, Thomas P. Gerrity, E. C. Habberstad (Also Oak Leaf Cluster to Silver Star), Charles H. Hillhouse (Also Oak Leaf Cluster to Silver Star), Francis B. Rang, Ignatius Sargent, James William Sibert, Edward C. Teats (Also Oak Leaf Cluster to Distinguished Flying Cross), R. E. Thacker. **LIEUTENANTS:** Donald E. Andersen, Joe M. Bean, Albert C. Biggs, Donald L. Bonham, Hilroy M. Boswell, Warren E. Bryant, Arthur L. Chambers, William T. Chesser (Also Purple Heart), William B. Compton, Stanley Cottage, John A. Crockett, Edward Crouchley, John M. Dawson, Richard H. Dennis, Alexander DeShazo, William A. Dietch, Robert B. Dockstader, Cedric P. Drake (Also Oak Leaf Cluster), Gene F. Drake (Also Purple Heart), James W. Duane, James G. Ellis, Gilbert E. Erb, George C. Farr, Owen R. Fish*, Harry H. Fitts, Seth A. Ford*, Thomas R. Fowler, Grover J. Gardner, Edward J. Gignac (Also Purple Heart), Ritchie B. Gooch, Eugene E. Greeson (Also Purple Heart), John S. Hancock, Wayne L. Hartman (Also Purple Heart), Clyde L. Harvey, Jr., Walter K. Heitzman, Alfred A. Heyman, Percy M. Hinton, Curtis J. Holdridge (Also Oak Leaf Cluster), Raymond E. Holsey, Jacob A. Hutchison, John W. Jacobs, Jr. (Also Purple Heart), Edward M. Jacquet (Also Oak Leaf Cluster to Silver Star), Thomas R. Jemison, Arnold Johnson, Charles C. Johnson III, Robert S. Johnson*, William R. Johnson (Also Oak Leaf Cluster), Wilfred B. Jones, William Joyner, Dale R. Kauffmann, John A. Kelting, Earl R. Kingsley, John D. Landers (Also Oak Leaf Cluster and Purple Heart), J. L. Laubscher, Donald H. Lee, Jr., Virgil B. Lindsey, Robert Linn (Also Oak Leaf Cluster), John D. Livingstone*, Marvin L. McAdams, Robert M. McComsey (Also Distinguished Flying Cross), Donald C. McGee, Hugh O. McTague (Also Oak Leaf Cluster), George M. Manning, James H. Martin, Jr., Harold V. Maull (Also Oak Leaf Cluster), William Meenagh, Cecil C. Metz, Purple Heart), Alan F. Neel, L. W. Neumann, Mack A. Mitchell, Donald A. Morse (Also Purple Heart), Alan F. Neel, L. W. Neumann, Paul F. Nunlist, Walter E. Nyblade, Charles A. Olson, Frederick O'Riley, Jr., Thomas C. Parkinson, Theodore I. Pascoe, Robert O. Pate, Melvin G. Pfund (Also Oak Leaf Cluster and Purple Heart), Stephen Poleschuk, Robert A. Price, R. V. Prouty, Robert L. Ramsay, Jr. **MASTER SERGEANT** Paul A. Flanagan. **STAFF SERGEANTS:** Jack H. Agee, John B. Chesson, John F. Clark (Also Purple Heart), Dan Erheart (Also Purple Heart), Julius A. Foster, Albert J. Kennedy, William V. Koon, Brewster M. Land, John A. Wallach (Also Oak Leaf Cluster), Herbert E. Wiest. **TECHNICAL SERGEANTS:** Lavert G. Dempsey (Also Oak Leaf Cluster), Guy K. Dozier, Kirby W. Neal (Also Oak Leaf Cluster), Quentin Pardue, C. C. Schierholz, Bernardino Tortora, Jack R. Tribble, Ivan M. Wright*. **SERGEANTS:** James A. Andrews (Also Oak Leaf Cluster), Herbert E. Baisch (Also Purple Heart), Orin W. Beardshear, Eugene F. Beistel, Edward K. Bentz, Carl M. Biehn, Norman L. Biehn, Quentin Blakely, Roy Bouse, Leonard G. Brazelton, Henry A. Buller (Also Oak Leaf Cluster to Silver Star), George A. Burke, Floyd H. Chamberlain, Benjamin Clifton, Harold R. Conner, William T. Corbitt, Thomas L. Cotner, Dale E. Crabtree, Harold E. Cummings, Daniel Darling, Jack F. Delaney, Virgil F. DeVoss, Walter A. Doiron, Leo H. Ferraguto, Mario J. Filigenzi, Norman L. Forte, Claude J. Fraley, Charles D. Franklin, Jr., Elias E. Gonsalves, William L. Hamilton, G. W. Hancock, Meyer Levin, William D. Lewis, John R. Mackley, Edward B. Malinay, Mack H. Nealy, Glenn D. Norton, Clarence R. Olson, Richard H. Olson, Donald L. Ornbaum, Edward G. Osborne, Jerome G. Parson, Eldon P. Pickett, Francis H. Pryor (Also Purple Heart), Ernest L. Pugh, Daniel Reuther, Jr. (Also Two Oak Leaf Clusters and Purple Heart), Norris T. Reynolds, Edwin Rhodes, Carl T. Robarts*, W. C. Rousel, George W. Schmid, Eugene D. Shafer, Joseph L. Soilowski, Norton G. Stubblefield, Marion C. Taylor, Jean P. Yates. **CORPORALS:** F. J. Antone*, Joseph Bayles, Ernest E. Brown, James O. Cannaday, Earle W. Curtis (Also Purple Heart), Robert F. Graf, H. L. Hernandez, James B. Holley, James N. Hume, John A. Irons (Also Two Oak Leaf Clusters), Roger A. McNamara, Holly Perkins (Also Purple Heart), David J. Thatcher, James C. Underwood, Joseph C. Wateski, William E. Wood, Joseph E. Wrenn. **PRIVATES FIRST CLASS:** Michael R. Andrade, Robert L. Avery*, Z. J. Balamut, Homer D. Bilyeu,* Peter R. Fabiano, F. F. Herman, Clydel Horn, George R. Lynch, Paul Mucha, Harry R. Parry*. **PRIVATES:** Edgar O. Arant, Carl T. Athey, Oscar C. Biddle, H. W. Davis*, A. A. Francisco, D. A. Garrett, Symie L. Glenn, Elmer G. Howes, Harry T. Isles, Mikel D. White, John J. Wilfley (Also Oak Leaf Cluster to Silver Star).

*Posthumous.

PURPLE HEART

LIEUTENANT COLONEL Boyd Wagner. **MAJOR** Leland O. Gee. **CAPTAINS:** Oliver C. Dona, Ross N. Huguet, Melville Offers, Warren S. Wilkinson. **LIEUTENANTS:** Allen Acomb, Frederick M. Armstrong, Jr., Bruce B. S. Barker, George B. Berkowitz, Oscar Black, Charles Cliburn (Also Distinguished Flying Cross and Air Medal), James J. Donegan, James A. Elder, Louis W. Ford, Oscar R. Kress, Thomas J. Lynch, Reuben W. Hager, Bartholomeo A. Passanante, Gordon H. Sterling, Jr.*, Kenneth

(Continued on Page 39)

The Air Medal

This is a cast of the new Air Medal, the design for which netted Private Walter Hancock of Camp Livingston, Louisiana, a prize of $1,500, awarded by the Army. Pendant from the Air Corps ribbon of blue and gold, a fleur-de-lis, symbol of North, surmounts a sixteen-point compass rose. The medal incorporates basic features of the American eagle and compass rose which had been included in preliminary designs prepared by the Special Services Division, Army Air Forces. The medal is awarded for meritorious achievement while participating in an aerial flight.

ONOR

A monthly record of decorations awarded to personnel of the Army Air Forces

LEFT TO RIGHT, above: T/Sgt. James M. Cooper; Lieut. Frank E. Adkins; Captain R. E. Thacker; Lieut. Lewis C. Murdock; Lieut. Robert O. Pate; Major Ralph S. Garman; Lieut. Thomas J. Lynch; Captain Charles Falletta; Lieut. Edward M. Jacquet, Jr.; Major Gordon A. Blake; Captain James W. Sibert and S/Sgt. Richard J. Barrett, Jr.

ROLL of HONOR

CONGRESSIONAL MEDAL OF HONOR

LIEUTENANT Harl Pease, Jr.*

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LIEUTENANT GENERAL George H. Brett. **MAJOR GENERAL** George C. Kenney (Also Purple Heart). **COLONELS:** John S. Allard, Lauri S. Norstad. **LIEUTENANT COLONEL** John Hubert Davies. **MAJORS:** Gordon A. Blake, John F. Devos, Edward F. Rector, John A. Rouse (Also Purple Heart), William A. Sheppard, Harold N. Willsie*. **CAPTAINS:** Harry N. Brandon, Thomas P. Gerrity, E. C. Habberstad (Also Oak Leaf Cluster to Silver Star), Charles H. Hillhouse (Also Oak Leaf Cluster to Silver Star), Francis B. Rang, Ignatius Sargent, James William Sibert, Edward C. Teats (Also Oak Leaf Cluster to Distinguished Flying Cross), R. E. Thacker. **LIEUTENANTS:** Donald E. Andersen, Joe M. Bean, Albert C. Biggs, Donald L. Bonham, Hilroy M. Boswell, Warren E. Bryant, Arthur L. Chambers, William T. Chesser (Also Purple Heart), William B. Compton, Stanley Cottage, John A. Crockett, Edward Crouchley, John M. Dawson, Richard H. Dennis, Alexander DeShazo, William A. Dietch, Robert B. Dockstader, Cedric P. Drake (Also Oak Leaf Cluster), Gene F. Drake (Also Purple Heart), James W. Duane, James G. Ellis, Gilbert E. Erb, George C. Farr, Owen R. Fish*, Harry H. Fitts, Seth A. Ford*, Thomas R. Fowler, Grover J. Gardner, Edward J. Gignac (Also Purple Heart), Ritchie B. Gooch, Eugene E. Greeson (Also Purple Heart), John S. Hancock, Wayne L. Hartman (Also Purple Heart), Clyde L. Harvey, Jr., Walter K. Heitzman, Alfred A. Heyman, Percy M. Hinton, Curtis J. Holdridge (Also Oak Leaf Cluster), Raymond E. Holsey, Jacob A. Hutchison, John W. Jacobs, Jr. (Also Purple Heart), Edward M. Jacquet (Also Oak Leaf Cluster to Silver Star), Thomas R. Jemison, Arnold Johnson, Charles C. Johnson III, Robert S. Johnson*, William R. Johnson (Also Oak Leaf Cluster), Wilfred B. Jones, William Joyner, Dale R. Kauffmann, John A. Kelting, Earl R. Kingsley, John D. Landers (Also Oak Leaf Cluster and Purple Heart), J. L. Laubscher, Donald H. Lee, Jr., Virgil B. Lindsey, Robert Linn (Also Oak Leaf Cluster), John D. Livingstone*, Marvin L. McAdams, Robert M. McComsey (Also Distinguished Flying Cross), Donald C. McGee, Hugh O. McTague (Also Oak Leaf Cluster), George M. Manning, James H. Martin, Jr., Harold V. Maull (Also Oak Leaf Cluster), William Meenagh, Cecil C. Metz, Purple Heart), Alan F. Neel, L. W. Neumann, Mack A. Mitchell, Donald A. Morse (Also Purple Heart), Alan F. Neel, L. W. Neumann, Paul F. Nunlist, Walter E. Nyblade, Charles A. Olson, Frederick O'Riley, Jr., Thomas C. Parkinson, Theodore I. Pascoe, Robert O. Pate, Melvin G. Pfund (Also Oak Leaf Cluster and Purple Heart), Stephen Poleschuk, Robert A. Price, R. V. Prouty, Robert L. Ramsay, Jr. **MASTER SERGEANT** Paul A. Flanagan. **STAFF SERGEANTS:** Jack H. Agee, John B. Chesson, John F. Clark (Also Purple Heart), Dan Erheart (Also Purple Heart), Julius A. Foster, Albert J. Kennedy, William V. Koon, Brewster M. Land, John A. Wallach (Also Oak Leaf Cluster), Herbert E. Wiest. **TECHNICAL SERGEANTS:** Lavert G. Dempsey (Also Oak Leaf Cluster), Guy K. Dozier, Kirby W. Neal (Also Oak Leaf Cluster), Quentin Pardue, C. C. Schierholz, Bernardino Tortora, Jack R. Tribble, Ivan M. Wright*. **SERGEANTS:** James A. Andrews (Also Oak Leaf Cluster), Herbert E. Baisch (Also Purple Heart), Orin W. Beardshear, Eugene F. Beistel, Edward K. Bentz, Carl M. Biehn, Norman L. Biehn, Quentin Blakely, Roy Bouse, Leonard G. Brazelton, Henry A. Buller (Also Oak Leaf Cluster to Silver Star), George A. Burke, Floyd H. Chamberlain, Benjamin Clifton, Harold R. Conner, William T. Corbitt, Thomas L. Cotner, Dale E. Crabtree, Harold E. Cummings, Daniel Darling, Jack F. Delaney, Virgil F. DeVoss, Walter A. Doiron, Leo H. Ferraguto, Mario J. Filigenzi, Norman L. Forte, Claude J. Fraley, Charles D. Franklin, Jr., Elias E. Gonsalves, William L. Hamilton, G. W. Hancock, Meyer Levin, William D. Lewis, John R. Mackley, Edward B. Malinay, Mack H. Nealy, Glenn D. Norton, Clarence R. Olson, Richard H. Olson, Donald L. Ornbaum, Edward G. Osborne, Jerome G. Parson, Eldon P. Pickett, Francis H. Pryor (Also Purple Heart), Ernest L. Pugh, Daniel Reuther, Jr. (Also Two Oak Leaf Clusters and Purple Heart), Norris T. Reynolds, Edwin Rhodes, Carl T. Robarts*, W. C. Rousel, George W. Schmid, Eugene D. Shafer, Joseph L. Soilowski, Norton G. Stubblefield, Marion C. Taylor, Jean P. Yates. **CORPORALS:** F. J. Antone*, Joseph Bayles, Ernest E. Brown, James O. Cannaday, Earle W. Curtis (Also Purple Heart), Robert F. Graf, H. L. Hernandez, James B. Holley, James N. Hume, John A. Irons (Also Two Oak Leaf Clusters), Roger A. McNamara, Holly Perkins (Also Purple Heart), David J. Thatcher, James C. Underwood, Joseph C. Wateski, William E. Wood, Joseph E. Wrenn. **PRIVATES FIRST CLASS:** Michael R. Andrade, Robert L. Avery*, Z. J. Balamut, Homer D. Bilyeu,* Peter R. Fabiano, F. F. Herman, Clydel Horn, George R. Lynch, Paul Mucha, Harry R. Parry*. **PRIVATES:** Edgar O. Arant, Carl T. Athey, Oscar C. Biddle, H. W. Davis*, A. A. Francisco, D. A. Garrett, Symie L. Glenn, Elmer G. Howes, Harry T. Isles, Mikel D. White, John J. Wilfley (Also Oak Leaf Cluster to Silver Star).

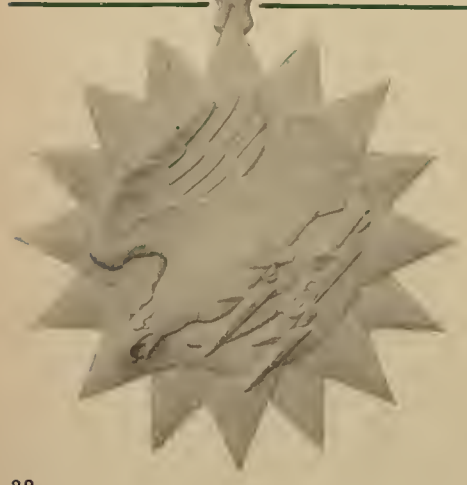
*Posthumous.

PURPLE HEART

LIEUTENANT COLONEL Boyd Wagner. **MAJOR** Leland O. Gee. **CAPTAINS:** Oliver C. Dona, Ross N. Huguet, Melville Offers, Warren S. Wilkinson. **LIEUTENANTS:** Allen Acomb, Frederick M. Armstrong, Jr., Bruce B. S. Barker, George B. Berkowitz, Oscar Black, Charles Cliburn (Also Distinguished Flying Cross and Air Medal), James J. Donegan, James A. Elder, Louis W. Ford, Oscar R. Kress, Thomas J. Lynch, Reuben W. Hager, Bartholomeo A. Passanante, Gordon H. Sterling, Jr.*, Kenneth

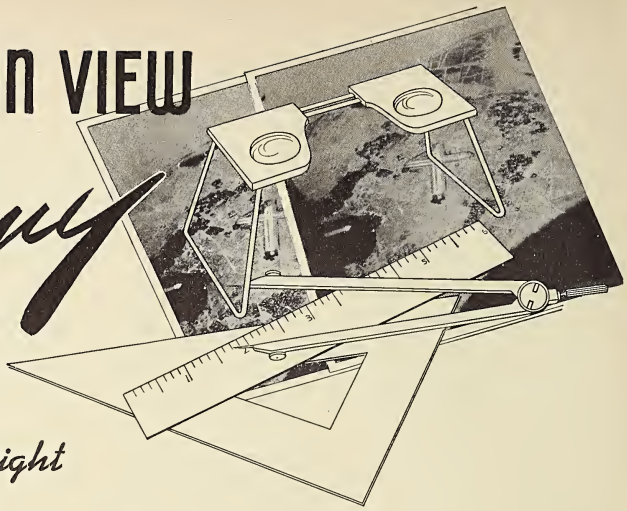
(Continued on Page 39)

The Air Medal



This is a cast of the new Air Medal, the design for which netted Private Walter Hancock of Camp Livingston, Louisiana, a prize of $1,500, awarded by the Army. Pendant from the Air Corps ribbon of blue and gold, a fleur-de-lis, symbol of North, surmounts a sixteen-point compass rose. The medal incorporates basic features of the American eagle and compass rose which had been included in preliminary designs prepared by the Special Services Division, Army Air Forces. The medal is awarded for meritorious achievement while participating in an aerial flight.

THREE-DIMENSION VIEW OF THE Enemy



By Captain L. B. Wright

HEADQUARTERS, ARMY AIR FORCES

Advances in aerial photography and photo interpretation make the camera a superhuman military observer who is seldom, if ever, fooled

WHEN the Japanese took Kiska Island in the Aleutians they tried to make our forces believe that they had considerable aircraft strength by creating outlines of dummy aircraft on the ground.

This did not fool our photo interpreters for a minute. Our own aircraft had taken pictures—aerial pictures which at once revealed the ruse.

Aerial cameras have become the superspies of modern war. Accurate knowledge of the enemy's strength, disposition and movement, and even his probable intentions, may be obtained by the aerial camera on a scale never remotely approached by the secret agents of other wars.

This has been made possible by three-dimensional photography technique and the relatively new science of photo interpretation, which constructs, from pictures brought back by a reconnaissance plane, a full and significant story.

Dependable interpretation relies upon a third-dimension view. Aerial photographs, viewed singly, provide only two dimensions. Since they give no sense of height, flat objects on the ground may be confused with buildings, innocent soil patterns take on the appearance of gun positions, and many objects—such as built-up roadways and levees, radio towers, power houses and transformer stations—may be missed altogether.

An aerial observer, flying over terrain at an altitude of a few thousand feet, can detect the relative height of objects. But the ability to do this diminishes as he gains altitude. The distance between the pupils of a man's eyes is approximately 2¾ inches; at great altitudes ground objects are viewed, in effect, from the same position by both eyes. Thus, the stereoscopic effect which enables man to recognize differences in elevation is eliminated. If the eyes could be spread apart, the difficulty would vanish. Impossible as that procedure is, a photographic method of accomplishing the very same thing has been developed.

An aerial camera is mounted in a reconnaissance plane to record vertical pictures of the ground. Two photographs are taken from different stations in such a way as to include part of the same terrain in each.

This results in two perspective views of the same land which, when viewed so that the left eye sees only the left photo and the right eye only the right photo, a perception of depth or third dimension is readily apparent.

MANY mechanical and optical devices have been built for the purpose of viewing stereoscopic pairs of overlapping photos of the same terrain, but the simplest and most commonly used is the pocket stereoscope. This instrument is similar to the old parlor stereopticon that provided so much fun in the "Gay Nineties."

Obviously, the aerial camera, utilized in this way, eliminates the human failings to which an observer on a reconnaissance flight would be subject and which would lessen the accuracy of his observation.

For instance, if he were to fly over hundreds of miles of terrain, his memory could not cope with all the manifold details of the ground below. If the plane were attacked by hostile aircraft, evasive action would undoubtedly be necessary and, in the excitement, scant attention could be given to observation.

The aerial camera, on the other hand, has an unfailing and capacious memory and yields a true visual record, in the minutest detail, of terrain over which the plane has flown.

A series of pictures obtained on reconnaissance might reveal, let us say, an armored column. The type of the column would be readily discernible, provided the scale of the photographs did not exceed 1/10,000. The speed with which it was traveling could be estimated by the spacing of the vehicles, the direction of travel by the position on the highway, and the strength by the number of each type of vehicle in the column.

Countless cases might be cited where three-dimensional photography has played an important role in the war.

For example, in the case of the Japs at Kiska, it was obvious from examination of photographs through a stereoscope that the dummy installations were flat, quite unlike actual aircraft. And, by counting and measuring the number of buildings erected and determining the height by means of a mechanical device known as the "Abrams Contour Finder," the quantity of supplies and strength of occupation could be estimated quite accurately.

The possibilities of obtaining intelligence data through photographs are virtually limitless.

Oil storage capacity may be determined with reasonable accuracy by measuring the diameter and height of oil tanks. The height and size of troop barracks is a good clue to the number of troops that can be housed in each building. By the elevation differences between gun positions and the surrounding terrain, the enemy's field of fire may be ascertained.

As a matter of fact, it would not be out of the question to plan an entire campaign from a stereoscopic study of terrain as revealed in modern aerial photographs.☆

What's your AIR FORCE I.Q.

IN THE interest of variety, AIR FORCE presents this month's Quiz in picture form. The following scoring method was set up by a very harsh teacher who hasn't munched an apple in months: eight out of twelve is passing; nine correct is a good score; ten is excellent; score eleven or round out the dozen and you're eligible for second helpings of everything, including promotions. Open your eyes and give it a try.

Answers on Page 36.

1. The award shown above is the

a. D.S.M. c. D.F.C.
b. F.O.B. d. D.S.C.

2. This Air Force General's name is

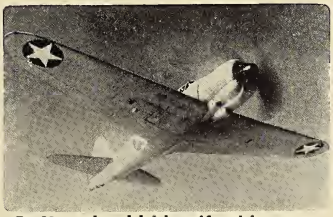
a. Brett c. Spaatz
b. Doolittle d. Brereton

3. What Command insignia is this?

a. Air Service c. First Fighter
b. Materiel d. Air Transport

4. This fighter plane is a

a. P-40 c. P-39
b. P-51 d. P-47



5. You should identify this as a

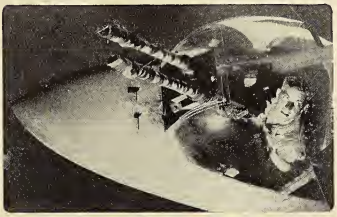
a. P-47 c. Zero
b. AT-6 d. Wildcat

6. Above you see a

a. Focke-Wulf 190 c. Airacobra
b. Hurricane d. Messerschmitt

7. The sergeant here is using a

a. Flare gun c. Traffic signal
b. Camera d. Sextant



8. This is the tail gunner in a

a. B-17 c. B-26
b. B-25 d. A-20

9. This officer is looking into a

a. Camera c. Bombsight
b. Drift meter d. Bank indicator

10. These men are directing a

a. Blind landing c. Control tower
b. Link trainer d. Radio beam

11. The ammunition shown here is

a. 20-mm c. 37-mm
b. 50-calibre d. 30-calibre

12. These men are working on

a. Carburetors c. Starters
b. Magnetos d. Pistons

We Keep 'em Firing

By Major J. B. Morris

Ellington Field, Texas

New target-towing techniques provide simulated combat conditions for gunnery and anti-aircraft personnel

Tow target work is an exciting and highly specialized function of the Army Air Forces.

Once, the most antiquated ship at hand would be assigned to towing. Targets were "snaked" off the ground on a long steel wire attached to the plane's tail and stretched to the far end of the field and back again before a take-off. What happened when the plane left the ground is obvious. The wire generally became taut just when the pilot needed most of his power. A lot of the gray-haired flyers you see were once tow target pilots.

Now, the "sock is dragged" by fast ships and the targets are paid out on a cable by a mechanical windlass—after the plane is in the air.

So great is the need for moving aerial targets, particularly by anti-aircraft units of the Coast Artillery, that the Air Forces now maintain full squadrons whose sole mission is to fly cylinders or "flags," or to serve themselves as a target in the night for Army ground units.

This is no dull, drab, boresome work. Target pilots spend their time being fired on 24 hours a day—fired on by everything from .30 caliber machine guns to rapid-firing "Biggies" that deliver high explosive shells—and they get to feel like sideshow performers dodging baseballs.

In the anti-aircraft training program, tow target missions fall into three broad classifications: tracking, searchlight and firing.

Tracking missions are performed in small ships which fly at a pre-determined altitude and over pre-determined courses. Anti-aircraft fledglings on the ground learn to follow the ships with sound locators, and later, with guns. Searchlight flying is about the same, done at night.

On one of these searchlight missions with the Fifth Tow Squadron at Ellington Field, you approach the searchlight battery from various angles and from a blackness that cannot be described. The pilot, crouched in the cockpit, flies by instruments or, as he terms it, "riding the gauges." You execute every maneuver the bomber can accomplish in an attempt to get out of the lights, then go out to start over again. Never flying outside a 25-mile area, you will have traveled —at the end of three hours or so—as far as from Los Angeles to Portland.

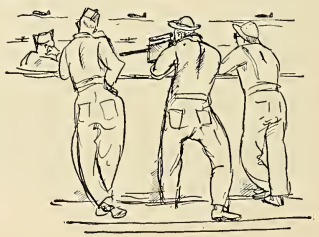
Flyers are never kept at this work long enough to get stale, for, after a few nights of it, they are the best night bombing pilots you can find.

Daylight towing for firing purposes demands the utmost in skilled precision of a crew.

The same bomber is loaded with an assortment of targets called "sleeves" or "flags." They are of various sizes and styles, to be used according to the type of guns being fired, altitude, sky conditions and other factors. The crew consists of pilot and co-pilot, radio operator, flight engineer and two reel operators.

The firing point and radio contact have been established with the anti-aircraft batteries on the ground. Then come the instructions.

"You will launch a B-14 target, red, and fly a clockwise course at 2,000 feet and tow with 1,800 feet of cable."



The pilot slows down the ship to minimum speed and, as it nears the stall point, gives orders to launch the target. Then, quickly, he closes the throttle and noses sharply down. This maneuver is to get up tail, thus giving better clearance for the target, and to regain speed without blasting the sleeve with propeller wash.

Attached to a cable, which is wound on a windlass, the bundle catches in the slipstream and opens into a red cylinder. (The target had been folded and wrapped with light yarn like a sailor stops his spinnaker.)

When the windlass operator has played out the required footage, you are ready to start the actual towing for fire. You fly in a continuous circle, passing the firing point about 200 yards from the anti-aircraft batteries. As they open up from a scant 2,000 feet below, it is a vivid experience to realize that they are firing at you.

There are, of course, elaborate safety precautions and, to date, no plane has ever been hit.

After a period of towing at this level, you are ordered to replace the "sleeve" with a "flag"—a large wire screen device forty feet long and nine feet high. This target requires 2,400 feet of cable and you are told to climb to 10,000 feet. These will be the "Biggies."

Up at 10,000 feet your technique is entirely different. Here you make runs of ten miles or so.

Sit in the tail gunner's seat; watch the tiny smoke-puffs from the batteries far below; see them burst accurately into the "flag" being towed several seconds later; see the "flag" soon torn to shreds, and you get a much better idea of the gunnery training our Army is receiving. ☆

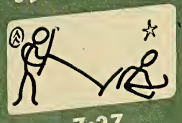
"ACL IN A DAY"

Around the clock with a Student Mech

By Private David F. Pierce

Casey Jones School of Aeronautics, Newark, N. J.


7:25 A. M.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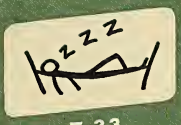

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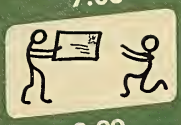
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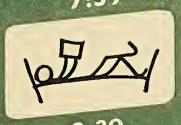
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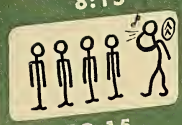
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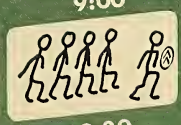
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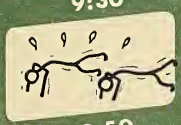
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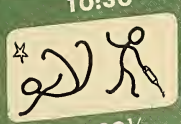
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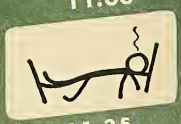
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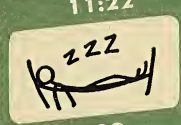
12:05 P.M.



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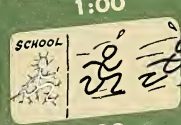

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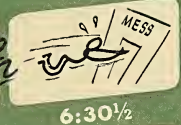

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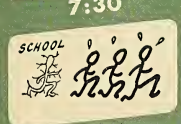

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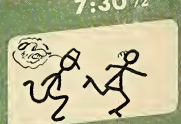
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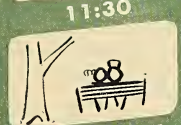
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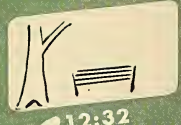
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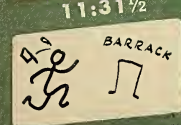

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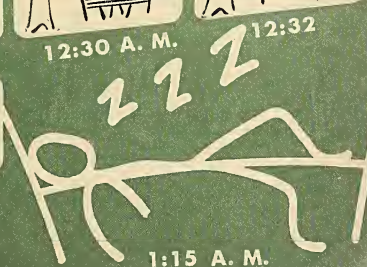


1:15 A. M.

TRAIN BUSTING

The New Art of Wrecking Nazi Rail Shipments

As told by an RAF pilot to J. D. S. Alan, Correspondent, London Sunday Dispatch

NIGHT and day great French locomotives rumble and thunder across Northern France, each drawing hundreds of tons of goods and war machines at the behest of the Germans.

They carry food, fabrics, and wines for the Herrenvolk, and French-made tanks, aero and lorry engines, and guns for the Russian and North African fronts.

They carry guns and cement for the fortifications fronting the Channel and North Sea.

For almost two years after the fall of France these trains were practically unmolested.

Then, unwittingly, slackness by the Luftwaffe wrote the doom of these trains by the hundreds.

Throughout the 1941 winter R. A. F. night fighters went on "intruder" patrol over the German aerodromes in the near-Continent. Many a German bomber, taking off or landing, was smothered by bursts of machine gun or cannon fire. Some were smashed by bombs dropped directly in their paths, though most of the intruders prefer to shoot rather than to bomb.

When spring came, the Luftwaffe sent up fewer and fewer night bombers.

More and more intruder teams—usually pilot, navigator-plus-bomb-aimer (bombardier), and rear-gunner-plus-wireless-operator—hung around the enemy aerodromes for long, boring hours, then went home without firing a shot.

So a few aggressive, rebellious souls, on completing their dull shifts, went looking for trains.

They found that if they fired a long, steady machine-gun burst at locomotive boilers the train would stop, the steam would pour from the punctured high-pressure tubes, and, sometimes, more gratifying still, the locomotives would actually explode.

When more intruders were fitted with cannon the results were sometimes obtained with a single sharp burst.

So the once-bored intruders spread the gospel.

Reports and photographs proved the damage and chaos on the overstrained rail system already suffering from lack of skilled maintenance engineers.

Train-busting became a recognized sideline. Indeed now, at times, special expeditions go out, although German aerodromes and planes are still the first objective.

The frantic Germans fitted armour plating over the boilers. But these did not stop the shells.

The Germans put anti-aircraft machine-guns in the tenders. These were easily overcome.

Mostly the train-busters fly so low that heavy A. A. guns cannot be depressed sufficiently in time to be of use. One buster followed a train so closely that he carried away a signal arm. Another, Sergt.-Pilot "Scruffy," blew up an ammunition wagon from such short range that his Boston was thrown almost upside down and came home holed like a colander.

On bright nights the intruders fly along the lines, looking at the continuous shining metals. If the lines are broken by a dark patch they look for a train. On cold nights they see the steam and smoke.

On dark nights they look for the tell-tale glow of the firebox or chimney.

The intruders are heartened by the knowledge that the French civilians are forbidden to travel at night. The railwaymen who operate the trains carrying war material to kill our troops and those of our Allies must take their chance, as must the engineers pouring out munitions for Germany in the French factories.

ONE of the pioneer train-busters, foremost in urging the practice as a sideline from aerodrome strafing, is a squadron leader.

The extensive successes and brilliant teamwork of his Boston crew played an important part in the development of train-busting, which has cost the Germans:

Locomotives worth more than $5,000,000;

Destruction of serious damage by fire, explosion, or train-wrecking to hundreds of thousands of tons of war material;

Delay of some kind to millions of tons of material.

Here an attempt is made to re-construct an astonishing night flight made by the squadron leader and his team as seen from the pilot's cockpit:

The machine is a Boston.

In front, and below, unseen in the nose, is the bomb-aimer. Behind, unseen, the rear-gunner.

So here we go. We are in the pilot's seat of the Boston, and have completed our duty patrols over aerodromes south of Paris. The moon is not far from full. There is a keen wind, the sky is absolutely clear, visibility is marvelous.

What happens tonight is a typical patrol, with much unmentionable back-chat between members of the crew.

We are flying down the Seine, with Paris behind us.

Let's get right down. Ease back level at 50 feet. Any coal barges to sink?

Whew, look at that flak crossing the river! It's hitting the houses on the other side. Let's go a bit lower.

Now the guns on the other bank have opened. We can get underneath the cross-fire.

Just look at that gasometer (gas tank). It must be two miles away! We'll get a bit closer, then turn in.

Four hundred yards away, 300. Wheel over hard right. Now she's in sight.

Squeeze the button. Watch our fire smack into her! Hard left or we'll hit her. Look, she's burning! Let us climb a bit and look back. See, she's glowing red hot inside. Wonderful sight.

Now we turn to the Rouen railway line. Up to 600 feet. No higher, because then the heavies might make it awkward.

Lovely night. What's that? A goods train! Must be four miles away. Ah, there she is. We'll get behind her.

Column forward a little. Now the train slides into view. Steady. Keep dead in line. Not too fast. I shan't open fire till we are half-way along, about 30 trucks from the engine.

Now, squeeze the button. Watch our fire sew up the train, setting the trucks ablaze. Check at the locomotive. Hold her. Now away, in a climbing turn. She's stopped. Steam is spreading over the fields. We'll turn back and have another crack.

What's that? Another train ahead? So there is. Down on her. Steady. Sew up the trucks. Hold on the locomotive. Ah! She's stopped.

Turn again, Whittington, and back again over them both. Look, there are some trucks not burning. Give them another squirt. Up they go.

Well let's get on to the Rouen-Havre stretch. Down a bit to dodge the heavy stuff.

We must be running a bit short of ammo. Look, another train. Hold tight. Down we go. Another squeeze. She's burning. See those flashes!

Up we go, over the engine. Turn at 500 feet for another crack, head on.

Press the button. Damn!

A short burst and she runs dry. Why don't we carry more ammo? Might as well go home now, chaps. ☆

ANSWERS

To Quiz on Page 33

1. d. Distinguished Service Cross
2. b. Major General James H. Doolittle
3. d. Air Transport Command
4. b. P-51
5. c. Zero with American insignia
6. a. Focke-Wulf 190
7. c. Traffic signal
8. c. B-26
9. b. Drift meter
10. b. Link trainer
11. b. 50-calibre
12. b. Magnetos

A JUMP AHEAD OF THE JERRY

(Continued from Page 7)

field guns to the rear. We were still using Hurricanes when I was transferred to the Second Eagle Squadron in May, but we switched to the Spitfire 5s early in June.

The Spits had everything the Hurricane didn't have, including heavier firepower with their two cannon and four machine guns. They were lighter on the controls and much touchier, but I'll still take the Hurricanes for maneuverability.

Soon after we got our Spits we started escorting the bombers across. The Germans reached the point where they wouldn't mix it up much with just fighters on a sweep—they waited for bigger game. We would go over escorting Blenheims, Hampdens and Bostons at one time or another, and the Jerries would come out.

AND YOU have to give those boys credit for a lot of guts, too. Here's what would happen on a typical bombing raid:

About six squadrons of us would be flying an umbrella over the bombers in layers, one squadron above the other. The enemy would be above us. All of a sudden, someone would yell over the intercom:

"Here comes one!"

Down would come a Jerry, through one layer of Spits after another, with all of us who were in position taking a squirt at him, until he could take a swipe at the bomber formation—if he got that far—and home he'd go. Others would follow his maneuver.

Occasionally, one would come up into us from below, roll over on his back to look us over, open up with a burst and roll into a dive.

If it's worked right you can give those bombers plenty of protection. In the dozens of bomber-escort sweeps I took part in during 1941 we lost only four bombers. Other squadrons had similar records.

In August of 1941 I was shifted to the First Eagle Squadron which was engaged in close escort work. The First Eagles were still using Spitfire 5s.

The R.A.F. fighter and bomber commands were exceptionally well coordinated. Our right hands and arms used to get tired as hell on those close escort sweeps. Sometimes we'd take the stick with our left hands and, frequently, both hands to give the right one a rest. Now and then, one of us would drop down and come in under a bomber formation, ease up close and rest for a half a minute or so. Those bomber fellows knew us like brothers.

I got my first Jerry on September 21, 1941. Like a lot of others I might have shot down one or two before, but this was the first one I could really count. You see, the R.A.F. won't let you chalk up a score unless you see the enemy plane crash, the pilot bail out or the plane break to pieces in the air. If you see one going down with an unusual amount of smoke trailing him, they'll let you count him as a probable.

Under this scoring system all of us probably got more than we actually counted. Most of the time we were flying so high we couldn't see them crash. Or else we were too damned busy to wait around and see what happened.

But, at any rate, I got my first one for sure that day we escorted six Hampdens to Lille. Incidentally, the Lille missions were the longest on which fighters served as escort.

It was a running fight all the way in and out. Mine happened to be one of the two escort planes to make the widest turn over the target, and just as we had completed the turn an ME-109E dived down on us. The C.O.—he was in the other fighter—figured the ME was too far out of range and kept on course, but I decided to go down after it.

I got a good squirt at the Jerry at about 5,000 feet and then finished him off at 3,000. He smacked the "deck" and broke into pieces but I managed to level off just over the tree tops.

All the Hampdens were hit by flak but none by German fighters. When I regained altitude to join the boys I weaved into a position on the tail of another squadron. That was the customary thing to do, for by the time we got straightened out under such circumstances, our own outfit would be pretty well up ahead.

ON THIS occasion I was just settling down when I saw what I thought was a fellow Spit weaving in to join the tail of another outfit across the way.

I remember saying to myself, "There's a guy who feels as good as I do." Just about that time, this other guy rolled over and shot the Spit about 50 or 75 yards in front of him all to hell. Pieces flew all over the place. The Jerry rolled into a dive and headed for home. You've got to be on the watch for that sort of thing.

During the month of October, the First Eagle Squadron had the top score for the R.A.F. I was pretty lucky. I managed to get five that month.

One of our best shows came early, on October 2. We jumped 24 Messerschmitts when we crossed on a mission that day. Four of us got there ahead of the rest of the squadron. The C.O. and I opened up on the first one and knocked him down. A little later I got two more. In all, we chalked up five out of the 24 without a loss.

On October 16 I got another one during a low-level "rhubarb" across the Channel. "Rhubarb" is the name the British use to describe a sort of private show the boys go on occasionally. We went on these little parties in pairs most of the time. That same day I blew up a train. When the locomotive exploded I was about 50 feet over it, and the blast boosted me up about 300 feet. Boxcars and "goods wagons" were ripped up all over the place.

It was on a similar junket eleven days later that I knocked down a couple of MEs. While flying alone I suddenly spotted six German fighters in formation. I came in from underneath and behind, and knocked off two before they knew I was there. Then I ducked out of the way before the others could do me any damage.

Fortune smiled on me that day. I managed to blow up my second train and mess up a gun post before heading for home. (Major McColpin was awarded the British Distinguished Flying Cross on November 8—Ed.)

I joined the Third Eagle Squadron, which had just been activated, late in January of 1942.

Early in February a sergeant pilot and I were convoying over the Channel when a bunch of Dornier 217s moved in with heavy cloud cover. I damaged a couple of them when they came out of the clouds for an attack. The sergeant who was new at the game, was running all over the sky like a chicken with its head off. Most of us react that way the first few times we get in hot combat.

One kite broke through and I shot out the tail gunner. I got the front gunner on another one just as my ammunition ran out. Later I made two attacks with empty guns, but the Jerries didn't know the difference and got the hell out of there.

We started making sweeps again in April, and on April 26 I got my first Focke-Wulf 190 in a scrap just off Boulogne. We didn't mind the Focke-Wulfs so much. They are more maneuverable than the Messerschmitts but the Spits have got it all over them.

I knocked out this one by pulling a little trick I had been studying for a long time. We had been waiting for the Jerries to dive in on us; then, just at the right moment, we would bank off to let them go by and continue the turn to get a crack at one as he passed. We didn't get touched following this procedure but we didn't get many cracks at the enemy either.

ON THIS occasion three Focke-Wulfs were diving on us, one after the other. We made the usual banking turn, to the left this time, but instead of continuing the turn I rolled over to the right and came back down, figuring I'd just about get the No. 3 Jerry in my sights. For a split second I thought I had miscalculated and he had gone by. But suddenly he zoomed in front of me and I let him have it.

The Third was the only Eagle Squadron that had any real night fighting. In all, I put in about 50 or 60 hours at night. Our best night fight came on April 29, after forty German bombers began blitzing York at two o'clock in the morning.

We were sleeping in quarters about three miles from our planes which were based about 60 miles from York. Within ten minutes after receiving a telephone call to turn out, we had dressed, reached our planes and taken off.

First to get in the air, I went through the entire take off more or less automatically.

I hadn't waked up sufficiently to know what was going on so I circled the field a couple of times with my lights on and the others followed. I remember shaking my head and asking myself aloud: "How the hell did I get up here?"

About that time we spotted the flames shooting high in the air from burning York. As we neared the town, I made the mistake of figuring a way I thought I could get in some extra licks.

After making an orbit around the town I dived into the middle, thinking I could knock off a few enemy bombers by spotting the source of their tracers as they came in to strafe the streets and houses. I didn't do too well. The other fellows stayed up a bit and got in some better licks. Some show. You could see the shells explode on the enemy kites and, now and then, one of their motors would catch fire.

Final score: three bombers destroyed (they found the wrecks after daylight), one probable (this one limped off toward the North Sea with one engine afire), and two damaged. One of us had to bail out.

We ran into a flock of ME-109Fs during a sweep on May 17, two weeks before I was scheduled to leave for the States on a couple of months' leave.

Before we took off on the sweep, some of the boys had been kidding me.

"You're surely going to kick yourself in the pants sitting in some concentration camp."

As it turned out, they were damned close to being right.

During the scrap I knocked down one for sure and shot the tail off another one but nobody saw him hit as we were flying at about 22,000. He was scored as a probable.

I was in no position to hang around for the result because a couple of Messerschmitts were on my tail and giving me hell. I went into a dive at 20,000 and picked up to about 620 miles an hour all the way down, full throttle.

When I finally leveled off I was about 20 feet over the water, and that's the way I came home. The Jerries chased me nearly all the way in.

I kept saying over and over to myself, "If you bastards think you're going to stop me from going back home, you're crazy."

I headed for the nearest airdrome on the coast and when I set my Spit down I had two gallons of fuel left. Another heavy turn in that dogfight and my leave would have been cancelled—maybe for good.

When I checked out for the States later in the month, I happened to be leading the Eagles with eight enemy planes down for sure. But more than that, I was two up on Gussie Daymond (Major G. A. Daymond, now with the Army Air Forces—Ed.) Daymond and I were engaged in what you might call a little private competition.

It started back when I went with the First Eagle Squadron—his outfit. When I checked in he already had four. I had none. From August to January, however, I knocked off six while he was getting one. That put me in the lead six to five.

Shortly after I joined the Third Eagles, he got another one to tie the score. Daymond then went on leave and, while he was away, I got a couple which put me in the lead again. But during my ensuing two months' absence he knocked down two more to lock the score at eight apiece. And that's the way it stands.

Shortly after returning to England in July of last year, I was given command of the Third Eagles and we started escorting American B-17s across the Channel. During the next few weeks we completed missions to such important target centers as Abbeville, Rotterdam, Rouen, Maux and Caen. The Germans had let up considerably in this area, which was probably a good thing for them for, in addition to the exceptional firepower of the Fortresses, my squadron was pouring it on for the first time with Spitfire 9s.

On September 15 we were transferred from the R.A.F. to the Army Air Forces. We continued to use Spit 9s and from then until the last of November, when some of us were ordered back to the States for interviews, most of our missions were with B-17s.

During my operational time, I learned quite a few lessons. But perhaps the one thing that stands out most in my mind is this:

The Jerry is good. Don't sell him short. But, when the sides are anywhere near even, you should never get shot down—or even hit—as long as you can see, and recognize his plane. The boys who get it are those who are caught unawares or are not up on their aircraft recognition. ☆

Lines to the 180° Turn

"Oh, I don't care," said Pilot Dumstare,
"How the barometer's lookin'.
I'm hotter than hell and I can tell
When any weather is cookin'.

"These forecast blokes are a bunch of jokes
With their isobars and highs.
They'll hold you bound to the solid ground
If they see a cloud in the skies.

"Form 23 is not for me—
I've got natural savvy for weather.
Just give me a ship and let me skip—
I'll bring her in like a feather.

"Just let it pour and let it roar,
Let it buck like the waves of the sea.
Why listen, brother, that's just another
Breeze for a pilot like me.

"I'll take a chance on the seat of my pants—
To hell with a right-about run.
I'll never learn a half circle turn.
It's dangerous? . . . Sure, but it's fun."

So up and away on a doubtful day
Went weather-wise Pilot Dumstare.
He headed for fun as he gave her the gun
And zoomed off into the air.

He didn't see on his Form 23
That a cold front was headed his way—
Nor did he care—not Pilot Dumstare.
(You recall what he had to say.)

So into the soup he dove with a whoop,
"This is my meat, watch me"—
And watch they did, for that dimwit kid
Who hadn't read Form 23.

They watched that night with growing fright—
He was eighteen hours overdue.
The wreck of his plane they found in the rain,
But Dumstare was nowhere in view.

It rained, it poured, the cold wind roared,
Three days of fury unbent!
Dumstare crawled in, wetter than sin,
Cold and ragged and spent.

Now Pilot Dumstare has an added care—
When he clears for a hop—even short!
You can watch him pore for an hour or more
Over every Weather Report.

If he can spy a cloud in the sky,
Or the trace of a coming breeze,
Then you'll discern that beautiful turn
Of a hundred and eighty degrees.

MAJOR HENRY F. CARLTON

ROLL OF HONOR

(Continued from Page 30)

M. Taylor, Francis R. Thompson, Richard K. Werner. **MASTER SERGEANT** David Semple (Also Oak Leaf Cluster to Purple Heart). **STAFF SERGEANTS:** James G. Brown, Lawton Buchanan, O. C. Cook, Leroy H. Penworden, Alvin Simonds, Claude F. Wiseman. **TECHNICAL SERGEANTS:** Frank Benedict, Verne T. Debes, Luther B. Word. **SERGEANTS:** Edwin L. Albrecht, Russell Fritz, Howard T. Harper, Francis E. Hurn, Wade L. Nelms, Olus E. Price, Warren V. Sherwood, Lloyd D. Whipp, Joseph O. Wingard. **CORPORALS:** Eugene R. Bennick, Francis M. Fowler, John T. McClarnon, Claude W. Winkler. **PRIVATES FIRST CLASS:** Loid W. Andersen, Charles O. Backstrom, Charles W. Bartlett, Levi W. Blakney, Herman Boyd, Harry S. Brissenden, Charles S. Brooks, Jr., Douglas L. Brown, N. D. Bunardzya*, Bert E. Byrd, Jr., Carmel R. Calderon, Franklin B. Cardwell, Dennis Cawley, Eugene L. Chambers, Leo R. Coale, Paul E. Comstock, T. V. Corbett, Robert P. Damsky, G. T. Davis, George Deraney, Grady E. Exum, Charles H. Freeman, Kenneth W. Gremore, Rogers W. Hall, Walter A. Hammond, Lester W. Holley, George L. Jones, Phillip J. Kane, Chester A. Lamb, John N. Leggitt, Deith E. Libby, Edward Lisiewski, William H. Manley*, James E. Martin, Louis W. Menge, C. C. Morrison, C. E. Narehood, Harry Newman, M. L. O'Brien, Marvin Olsen, Joseph J. Panek, Donald D. Plant*, Charles P. Porterfield, John L. Preston, I. H. Pulley, Jr., Eugene R. Ray, George L. Richardson, Joseph H. Riotte, G. R. Rosenberry, R. L. Schott*, H. L. Sembroski, R. R. Shattuck*, Maurice E. Stevens. **PRIVATES:** Kenneth E. Adams, Edward L. Allen, Robert G. Allen*, James S. Altamare, Herbert Aubrey, Clinton D. Baer, Robert E. Baird, Walter A. Barasha, Leonard M. Barnes, Jr., James Bibb, Robert W. Bloxham, Seymour Blutt, Joel J. Boersema, Jack L. Bois, Paul T. Bowsher, Jr., Alfred W. Broughton, Robert L. Brown, Francis R. Bush, Roy W. Byers, Robert T. Byrd, Francis E. Campiglia, L. D. Carey, Dean W. Cebert*, Joseph A. Christopher, Charles S. Clague, Walter L. Collins, Fred R. Conner, John Couhig, Charles W. Craig, Lincoln M. Crum, Charles R. Dagon, Frank R. Dallas, Allen D. Davis, Robert E. Dietterick, Oscar H. Douglas, William T. Duvall, Cecil W. Dye, Jerome A. Even, Benjamin P. Faunce, R. G. Fitzsimons, Robert E. Fleming, George J. Gabik, Bill P. Gautier, George W. Goff, Allen E. W. Goudy*, Robert D. Hamrick, Roy Hendricksen, Charles W. Hill, Jr., John P. Holloway, William H. Hudson, Earl F. Hughes, Robert L. Hull*, James L. Johnson, Thomas R. Johnson, James F. Jones, Louis Jorda, Jr., Bert J. Jordan, Don R. Joyce, Walter L. Kaminski, V. J. Kechner, Wallace A. Kempen, Phelps W. Kight, Thomas P. Kimble, James S. Kossak, Walter Lapie, Harold Lenburg, Ivan C. Lewis, John S. Lopinsky, Warren Lyon, R. W. McClellan, Cecil H. McDonald, B. P. McLeod, J. H. McRoberts, William W. Mauhar, Paul Mitchell, Kenneth L. Mougin, Vernon A. Nelson, Edward M. Ovecka, Ralph G. Paschall, Louis Penven, Donald H. Peterson, Raymond Raines, William L. Reininger, B. A. Reynolds, Edwin Roberts, H. J. Roseman, M. D. Sackett, L. J. Scalzo, E. L. Schmitz, Frank A. Staab, Arthur W. Werner, Elmon S. Yargus.

DISTINGUISHED FLYING CROSS

COLONELS: John R. Hawkins, Paul L. Williams. **LIEUTENANT COLONELS:** Alvin Edward Herbert, Charles H. Kruse, Elliott Roosevelt. **MAJOR** John E. Dougherty. **CAPTAINS:** John L. Brownewell, William J. Cummings, P. W. McIntyre, John P. Randolph, Robert M. Ritchie, Charles R. Sneed, Henry G. Thorne, Robert C. Williams. **SECOND LIEUTENANTS:** Louis B. Briglia, Emmette W. Ford, Perry L. Franks, Raymond M. Gehrig, Warren George, Jr. **PRIVATE FIRST CLASS** John A. Aresl.

SOLDIER'S MEDAL

MAJOR John R. McBride. **STAFF SERGEANTS:** Marnice E. James, Milton F. Kelm. **TECHNICAL SERGEANTS:** Robert M. Aardema, Albertis P. Hildred. **SERGEANTS:** Albert C. Corbello, Eugene W. Cull, A. H. Paddison. **CORPORAL** Clarence E. Bauer. **PRIVATES FIRST CLASS:** Stanley J. Bogdan, Alfred O. Bonin, Walter D. Boulier, James E. Carrow, Edward H. Cavanagh, Solomon Crystal, Myron R. Grant, Abney C. Hines, James A. Huff, Romuald Kaster, Everett D. Keim, G. E. O'Connell. **PRIVATES:** Thomas P. Deutsch, Dominic J. Dibiasi, Hoyte W. Galloway, Michael G. Heick, W. I. Martin, Jr., W. R. Nixon, Jr., E. R. Savage, Edward A. Singer, Tony Tintori, Harry L. White.

AIR MEDAL

COLONEL John N. Stone. **MAJOR** Ralph S. Garman. **CAPTAINS:** Alexis Klotz, C. R. Rimke, John C. Wagner. **LIEUTENANTS:** Earl L. Carron, Frank H. Donnelly, Leo Hawel, Robert M. Lupton, Jr., Lewis C. Murdock, Frank G. Smolinsky (Also Oak Leaf Cluster), G. W. Sutcliffe, H. W. Willis. **MASTER SERGEANT** Joseph H. Switlik. **STAFF SERGEANTS:** Richard J. Barrett, Jr., John E. Owen. **TECHNICAL SERGEANT** James M. Cooper. **SERGEANTS:** Orville S. Splitt, Rudolph Turansky (Also Oak Leaf Cluster), George E. Williams (Also Purple Heart), John C. Ford, Ben Lomond, Russell E. Ojala, Victory P. Minkoff. **CORPORAL** Charles H. Reynolds.

Col. John M. Stone

Lieut. Bruce B. Barker

Lieut. Leland A. Walker, Jr.

Captain Jack Adams

Captain Melville Offers

OAK LEAF CLUSTERS

CAPTAINS: Harold N. Chaffin, Richard T. Kight, George E. Schaetzel. **LIEUTENANTS:** Donald C. Miller, William M. Railing*, Merle C. Woods. **MASTER SERGEANT** Durward W. Fesmire. **STAFF SERGEANTS:** Max Baca, William E. Bostwick, Derwin D. Terry. **TECHNICAL SERGEANTS:** Francis G. Denery, John M. Geckler (Two Oak Leaf Clusters to Silver Star). **SERGEANTS:** Ignatius E. Barran, Edward J. Czekanski, Orville W. Kiger (Two Oak Leaf Clusters to Silver Star), Victor Lorber (Two Oak Leaf Clusters to Silver Star), Arthur W. Norgaard, William Sage, C. W. Thrasher, Richard A. Williams. **CORPORAL** Robert A. French*. **PRIVATE FIRST CLASS** John Makela. (* Posthumous.)

PICTURE CREDITS

8: Appleton Studio. 15: National Advisory Committee for Aeronautics. 22-23: "The World in Maps," by W. W. Jervis. 28: Fairchild Aircraft. 33: Rudy Arnold; Life. All other photographs secured through official Army Air Forces sources.

(Continued from Page 13)

the necessary administrative tools. This is the function of Management Control, which includes within it the divisions of the Air Adjutant General, Statistical Control, Organizational Planning and Legislative Planning.

4. All military organizations require special staff sections. The duties of the Budget and Fiscal Officer, the Air Judge Advocate and the Air Inspector are not unlike those of similar officers in all traditional military organizations. The Special Staff Section also includes the office of the Air Surgeon, under whose supervision comes the effects of high altitude flying and other aspects of the physiology of flight.

5. An air force in operation divides itself readily into four basic parts—Air Defense, including fighters, anti-aircraft artillery, and an aircraft warning service; long range Bombardment, including heavy and medium bombers; Air Support of ground forces, including dive bombers and light bombers as well as fighters used for strafing ground troops, and Base Services, composed of facilities and supplies which are necessary to get combat aircraft into action. To insure that these four essential military requirements are properly met, a director of each type was created with the duty of supervising and directing, in the name of the Commanding General, the development of their particular specialty in the Army Air Forces.

THESE so-called "Type Directors" are on the Operational Staff level. They supervise and direct the execution of the policies determined by the Air Staff. Their activities are coordinated by the Director of Military Requirements. Since the training of individuals is a large part of the job and the movement of units and their organization into task forces is also an essential preliminary to combat, Directorates of Individual Training and of War Organization and Movement also were added under the Director of Military Requirements.

6. There are certain specialties in which an air force has a vital interest, so vital an interest that it is desirable to have a staff section charged with supervision of the development to high proficiency of the technical service involved. To meet this need Directorates of Photography, Communications and Weather have been created. Their activities are coordinated by the Director of Technical Services who is on the Operational Staff level.

7. It was apparent in building an air force of over two million men that innumerable personnel questions of an operating nature would arise, and it was desired to free the A-1 Section of the Staff from the interminable detail of current personnel matters in order that it might devote itself to personnel planning in the broad sense. So, a Director of Personnel was created to be responsible for the detailed procurement, classification, assignment, promotion and discharge of both military and civilian personnel.

8. Training flying personnel as rapidly as possible for combat raises serious problems in connection with the prevention of accidents. Safe flying calls for coordinated direction of air traffic. Accordingly, a Directorate of Air Traffic and Safety has been created on the Operational Staff level. Reporting to it are the Directors of Flight Control, Flying Safety and Safety Education. The purpose of the Directorate is to supervise the Army Air Forces flight control system, establish programs to prevent aircraft accidents and provide for safety education of Army Air Forces personnel.

The various sections and divisions described above constitute Headquarters, Army Air Forces. They are in a certain sense an integral part of the brain of the Commanding General. When they speak, they speak in his name and by his authority. They make it possible for him to be advised on all of the vital functions which must be performed if the mission of the Army Air Forces is to be accomplished.

So far, this article has dealt largely with policies and operational planning. The plans, programs and policies approved by the Commanding General upon recommendation of his Staff are carried into effect by the various Army Air Forces Commanders and the Air Forces. Performance of the mission of the Army Air Forces can be likened to a series of funnels, all leading to a main pipe.

Into one funnel—the Technical Training Command—go individuals who are to furnish the technical and administrative personnel for the Army Air Forces, such as radio operators, mechanics, personnel officers, supply officers, weather, photographic and communications personnel and the like.

Into another funnel—the Flying Training Command—go the flying personnel, including pilots, observers, bombardiers, navigators and aerial gunners.

Into a third funnel—the Materiel Command—go plans and specifications for the aircraft and technical equipment which the Air Forces will use. Contracts are drawn, production schedules prepared, inspections performed and modifications made.

The completed aircraft and equipment flows into a pipe marked Proving Ground Command. Here it is tested in flight.

The resulting product then splits into two pipes. Aircraft are flown to their destination by the Air Transport Command. Equipment is stored in depots by the Air Service Command and delivered on requisition to the using units. Both equipment and aircraft when in need of repairs or maintenance flow back upstream to the Air Service Command.

The pipe whose funnel is the Materiel Command meets the pipe whose funnels are the Technical Training and Flying Training Commands at the schools with respect to training aircraft and equipment and at the Air Forces with respect to combat aircraft and equipment.

The Air Forces in the continental United States have dual functions. On the eastern, southern and western coasts they are part of the defense commands charged with defending the country against attack, but they also provide the operational training which is a necessary prelude to combat. Units are formed from graduates of the schools and work together until they are ready for overseas duties. As occasion requires, units are detached from these Air Forces and sent to the air task forces which are fighting the war. This is one step in the formation of Air Forces overseas.

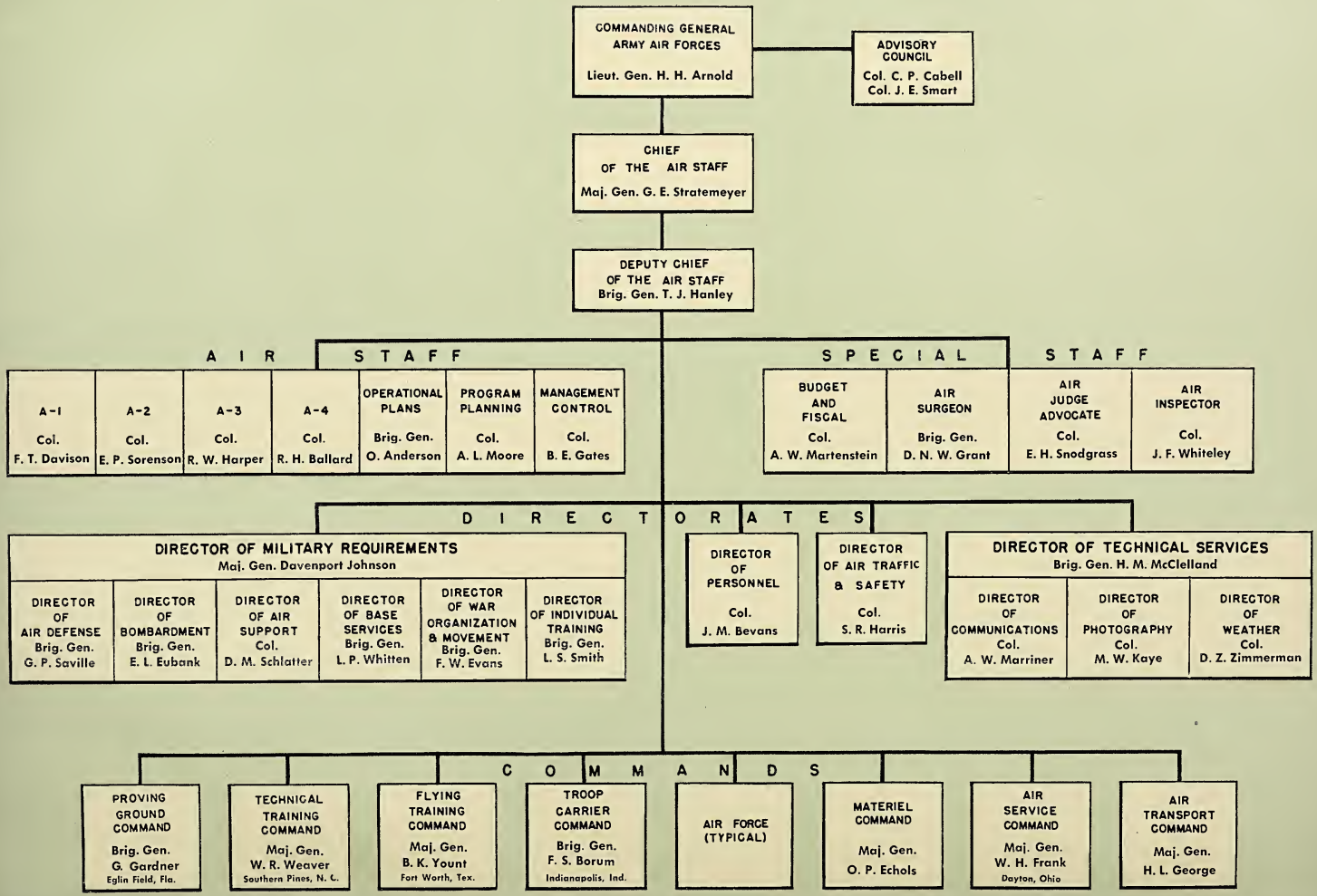
TO train the personnel required for such aspects of modern war as the transportation of airborne infantry, parachute troops and glider-borne troops, the Troop Carrier Command was organized. It does the operational training for this type of unit.

To run the airlines which circle the globe, carrying personnel and equipment to theaters of operation, the Ferrying Command was organized in 1941. Shortly after the reorganization of March 2, its name was changed to Air Transport Command. It also delivers aircraft from factory to field, whether that field be located in Chattanooga or Chungking. It is engaged in operating the most extensive transportation system in the history of the world.

The picture would not be complete without mention of the units of other arms and services on duty with the Army Air Forces. An air task force could not function successfully without units and individual personnel drawn from the Corps of Engineers, the Ordnance Department, the Quartermaster Corps, the Signal Corps, the Chemical Warfare Service and the Military Police. Chaplains perform an essential function with all Army units. More recently the WAACs have arrived to add their important bit to the total picture. Service personnel of this character is procured for the Army Air Forces by the Services of Supply and is welded into the Army Air Forces organization during the operational training period. Relations between these other arms and services and the Army Air Forces are coordinated at Headquarters by the Directors of Base Services, Communications and Personnel.

These, then, are the agencies through which the Commanding General, Army Air Forces, performs his mission of procuring and maintaining equipment and providing Air Forces units trained for combat. It is obviously impossible in so brief an article to do more than paint the broad picture of organization. In a very real sense this organization has grown from the necessity of modern war. Since those necessities are constantly changing, it is not unreasonable to suppose the organization will also undergo revision from time to time. ☆

ORGANIZATION OF THE ARMY AIR FORCES




HALT!
HIS DUTY– TO SEE YOUR PASS.
YOUR DUTY–TO SHOW IT!

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

MARCH 1943

Vol. 26 No. 3

MARCH 1943

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Air Force is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

March Brief

HELICOPTER is not a coined word or a trade name. It is as much a part of aviation terminology as, let's say, monoplane or glider. And there are those who insist that the word helicopter will be a household favorite in the years to come.

Be that as it may, we support this month's cover picture with two articles and additional pictures of the Army Sikorsky Helicopter — described as "the Army's first practical and successful helicopter aircraft." The cover picture shows that craft standing still in mid-air to take on a passenger without landing.

Colonel H. F. Gregory of Wright Field will introduce you (on Page 6) to the Army Sikorsky Helicopter. Colonel Gregory, who acted as project officer for the development and procurement of this "flying windmill," reports on the results of more than ten months of testing the ship and takes you through the motions of flying it.

This wingless aircraft was delivered from the factory to Wright Field last May in what was a helicopter's first cross country flight in the Western Hemisphere. Not long after its completion C. L. Morris, the pilot, recorded the trip while its details were still fresh in his memory. Now, after ten months, his story can be told. The mile-by-mile narrative by Mr. Morris, full of sidelights and humor, starts on Page 7.

YOU MAY be surprised to hear that in place of radio equipment another seat has been wedged into the cockpit of the P-38, making it possible for this single-seater to serve as a transition trainer. The story of the conversion is told on Page 10 by Lieutenant John Truesdell of the Directorate of Flying Safety.

IF YOU'RE INTERESTED in a combat report on what it means to stay a jump ahead of the enemy we refer you to the article on Page 4. We've called it "What You See Won't Hurt You," and offer it as practical comment on the important aircraft recognition problem. The author is Lieutenant Charles W. Tribken, Jr., a 24-year-old fighter pilot who recently completed 200 operational hours with the Royal Air Force, first with an Eagle Squadron in Britain, then with an RAF unit in Africa. He flew late model P-40Es through the last big desert push against Rommel's forces. After a year and a half with the RAF, Lieutenant Tribken has just been transferred to the Army Air Forces. This is his first attempt at writing for publication and we don't mind saying we would be happy to use more of the same caliber. That's an open invitation.

MOST OLD TIMERS have at one time or other toyed with the idea of a navigation system to end all navigation systems. The instrument labs at Wright Field are flooded with navigation inventions of all types, and welcomes more. The job, explains Colonel Thomas L. Thurlow, of Wright Field, "is to spot the phony systems and to encourage development of the ones that can be depended on to bring our planes home." Colonel Thurlow's article should help you recognize the phony and the good. It begins on Page 8.

MAJOR JOHN C. HENRY of the Air Transport Command, former Washington newspaperman and president of the White House Correspondent's Association, was stationed at the ATC base in West Africa where Brigadier General Patrick Hurley stopped overnight enroute to Russia on a special mission for President Roosevelt. At General Hurley's request, Major Henry joined the party—the first group of foreign observers permitted to view action on the Russian front. An account of their observations was written by Major Henry for AIR FORCE. It appears on Page 17.

FLIGHT CONTROL at first glance looks like a pretty ornery looking beast, writes Lieutenant Colonel George C. Price, Director of Flight Control for the Air Forces, but isn't such a bad critter once you get used to it. Colonel Price explains what he means in an article on Page 12.

THE SOLOMON ISLANDS haven't been an ideal spot for a lengthy canoe trip, but Lieutenant Wallace S. Dinn, Jr., a Southwest Pacific P-39 pilot, managed it all right. After bailing out of his crippled ship over the Solomons, Lieutenant Dinn, with some friendly natives, paddled to safety eight days later. Oh, yes, there was another passenger—a Jap pilot whom they captured enroute. Lieutenant Dinn tells about the experience on Page 23.

CARDBOARD SPLINTS? Yes, they form the basis for a novel combat first aid method originated by Major Walter J. Crawford, March Field, California, and outlined on Page 20 in an article by Sergeant Max Baird. Major Crawford is a flight surgeon on leave from the medical faculty of Tulane University. Sergeant Baird is a former Kansas City newspaperman and magazine writer.

FORMERLY THE AIR FORCES NEWS LETTER

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CROSS COUNTRY

What Army Emergency Relief means to you; developments of the month within the Army Air Forces.

"IT'S NOT just being away from home," a sergeant explained the other day. "A guy expects that in the Army. It's wondering whether the family is making out all right, and if they'll be taken care of if an emergency comes up."

For some time now we've been hearing about Army Emergency Relief. Radio programs, football games and stage shows, we've been told, are giving all or part of their take to the fund. Dollars, millions of them, have been pouring in. What happens to all that dough?

A man came to his local AER office and explained he had four sons in the Army. They had supported the family. Until their allotments arrived, he needed money to pay taxes, mortgages and interest on the home. Through AER a loan was granted, the house saved. The money was repaid when the allotment check arrived.

A wife with an Army husband in Australia had saved carefully for her baby, but gave birth to a son two months prematurely. It meant a lot of extra money for incubators, nurses, etc. The AER came quickly to the mother's aid, gave her a check for what she needed.

A young lieutenant with a wife and two children, who lived up to the limit of his salary, was suddenly ordered on a mission. The expenses would be at least a hundred bucks, and he didn't have it. The AER supplied him with the cash, and when he returned and collected his per diem, he repaid the loan.

A worried mother, with an eight-year-old daughter and an Army husband a long way from home, came to the AER for help. Dentist bills for the girl had piled up; gas and electric light bills had to be paid. She was getting behind and saw no way of catching up. The AER took all her bills, paid them and put some cash in her pocketbook to help her get a fresh start.

A private, called home when his wife gave birth to a child, had saved up $200 for the event, estimated as enough to cover expenses. But there was trouble—a Caesarean, blood transfusions, plenty of complications. The $200 didn't half cover the expense. The AER stepped in, gave the private the money needed for all the unexpected extras. He went back to camp a much happier guy, knowing AER was behind him. That's not speculation, either, for he wrote AER a letter of thanks and told them so.

Hundreds of similar cases could be cited. For Army Emergency Relief means just what it says—relief for military personnel and their dependents in an emergency—and it was set up at the instance of the Secretary of War for that purpose. Here's how it works:

If an Army man or his dependent needs money he can go to his nearest AER station and present his case. He fills out applications — this is still the Army and there's sure to be paper work — and the case is investigated. If relief is granted, the applicant is given a loan, cash grant or relief in kind (food, clothing, etc.), depending on the nature of the case.

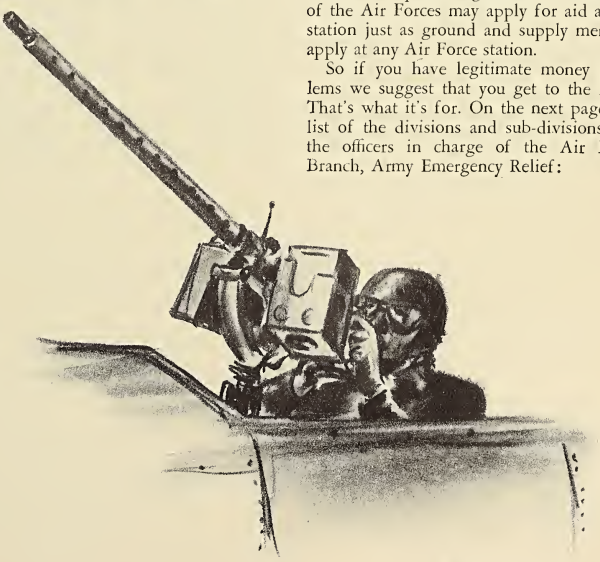
The AER works hand in glove with the American Red Cross; in fact, it was a grant of a million and a half dollars from the Red Cross that started the ball rolling. And now it is the Red Cross, through its field representatives, that investigates cases coming to the attention of the AER.

No funds are solicited by this outfit. It takes money donated through benefits and the like, but no contributions are asked for. The Red Cross is, in a sense, its sponsor and the Red Cross will undertake to make up any deficit.

Of approximately 400 AER stations in cities and stations throughout the country, the Army Air Forces operated 223 of them as of February 8.

But the Air Force branch of the AER is in no sense a separate organization. A member of the Air Forces may apply for aid at any station just as ground and supply men can apply at any Air Force station.

So if you have legitimate money problems we suggest that you get to the AER. That's what it's for. On the next page is a list of the divisions and sub-divisions and the officers in charge of the Air Force Branch, Army Emergency Relief:



Division	AER Officer
1st Air Force, Mitchel Field, N. Y.	Major F. Cassidy
2nd Air Force, Spokane, Wash.	Capt. Jack Green
3rd Air Force, Tampa, Fla.	Colonel J. N. Douglas
4th Air Force, San Francisco, Cal.	Capt. T. Kendall
Air Service Command, Patterson Field, Ohio,	Major Loren Robinson
Air Transport Command, Air Forces Annex Nat. Airport, Gravelly Pt., Va.	Capt. A. Goodman
Dist. of Columbia, 703 Maritime Bldg.,	Lieut. Col. Dudley S. Dean
Flying Training Command, T & P Bldg., Fort Worth, Texas	Major Walter Dunham
Gulf Coast Sub-Div., Randolph Field, Tex.,	Major Henry Stein
Southeast Sub-Div., Maxwell Field, Ala.,	Captain F. C. Peck
West Coast Sub-Div., Santa Ana, Calif.,	Captain G. H. Teeple
Materiel Command, Wright Field, Dayton, O.,	Major John Masner
Tech'l Train'g Command, Knollwood Field, N. C.,	Major H. V. Carson
Sub-Div. No. 1, Greensboro, N. C.,	Lieut. John J. Gerlach
Sub-Div. No. 2, St. Louis, Mo.	Capt. E. R. Elbel
Sub-Div. No. 3, Tulsa, Okla.	Capt. Earl Knighton
Sub-Div. No. 4, Denver, Colo.	Capt. C. Goldsbury
Sub-Div. No. 5, Miami Beach, Fla.	Lieut. C. Linden
Troop Carrier Command, Stout Field, Indianapolis, Ind.	Capt. O. L. Heath

Air Forces Aid Society

THERE is, within the Air Forces, another agency called the Army Air Forces Aid Society. This is solely Air Force, and not an emergency fund. In fact, the fund will not be used until after the war. Then its function will be to assist Air Force personnel and their families in rehabilitating themselves in regard to education, employment, financial aid, etc.

The Aid Society is building up a trust fund from voluntary gifts and contributions which it is allowed to accept although no solicitation of funds can be made at the present time. A number of writers, for instance, have assigned their pay or royalties to the society.

A Memorial Division has been created within the Aid Society which makes it possible for those wishing to make a contribution in memory of a friend or relative to send a sum of money, in lieu of flowers, to the society's trust fund. Any gift, however small, may be sent to the Society, which in turn will forward a card, bearing the donor's name, to the bereaved widow or family, explaining that a sum (amount undisclosed) has been contributed to the trust fund in memory of the deceased friend. This memorial will be perpetuated on the official rolls of the Society. These contributions will become part of the fund established to aid and assist Air Forces personnel and their dependents in distress after the war is over.

Voluntary donations may be sent to the Army Air Forces Aid Society, Inc., Room 703 Maritime Building, Washington, D. C.

Weather Training School

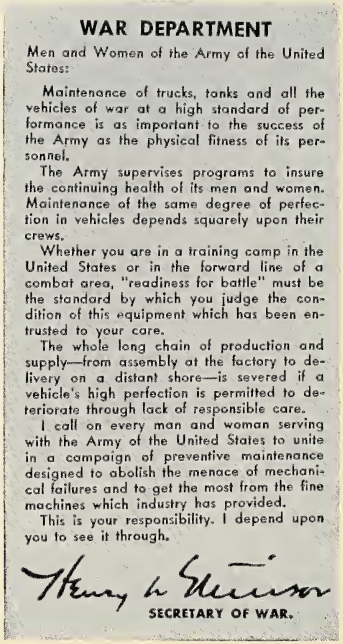
THE Weather Training School of the Air Forces has been expanded and relocated at Grand Rapids, Michigan. Under jurisdiction of the Technical Training Command, the school was formerly operated on a smaller scale at Chanute Field, Illinois.

To qualify for the school students must have completed two years of college training and at least one year of college physics. After nine months' training, students qualify for commissions as second lieutenants.

A new course, not before offered, will qualify a number of cadets as Aviation Meteorology Cadet Instructors, who will be assigned as second lieutenants to flying schools to instruct flying officers in meteorology.

New Air Force Award

IT TAKES a lot of drivers and automotive mechanics to keep the expanding Air Forces going. And now this assignment has been recognized. A silver badge for vehicle drivers and mechanics is now in production and ready for distribution. Each qualified vehicle driver and mechanic in an organization of the Army Air Forces, who is regularly assigned to duty in the capacity of driver, assistant driver or automotive mechanic, will be awarded a badge with an appropriate bar indicating the specific individual qualifications.



WAR DEPARTMENT

Men and Women of the Army of the United States:

Maintenance of trucks, tanks and all the vehicles of war at a high standard of performance is as important to the success of the Army as the physical fitness of its personnel.

The Army supervises programs to insure the continuing health of its men and women. Maintenance of the same degree of perfection in vehicles depends squarely upon their crews.

Whether you are in a training camp in the United States or in the forward line of a combat area, "readiness for battle" must be the standard by which you judge the condition of this equipment which has been entrusted to your care.

The whole long chain of production and supply—from assembly at the factory to delivery on a distant shore—is severed if a vehicle's high perfection is permitted to deteriorate through lack of responsible care.

I call on every man and woman serving with the Army of the United States to unite in a campaign of preventive maintenance designed to abolish the menace of mechanical failures and to get the most from the fine machines which industry has provided.

This is your responsibility. I depend upon you to see it through.

Henry L. Stimson

SECRETARY OF WAR.

To qualify for an award a driver must: (1) Pass aptitude test and standard driver's qualification tests (practical and written) as prescribed by FM-25-10 for wheeled vehicles or FM-17-5 for track-laying vehicles. (2) Perform duty for a minimum of three months as a driver or assistant driver of an Army vehicle without traffic violations and with an accident-free record and a rating of "excellent." (3) Be assigned to duty as a driver or assistant driver of a vehicle. (4) Have not had award revoked for cause during the previous six months. To qualify for an award an automotive mechanic must: (1) Complete a standard vehicle mechanic's course with a rating of "skilled" or have sufficient previous experience as an automotive mechanic to justify a skilled rating. (2) Perform duty for a minimum of three months as an automotive mechanic, second echelon or higher, with a rating of "excellent." (3) Be assigned to duty as an automotive mechanic, second echelon or higher. (4) Have not had award revoked for cause during previous six months.

Distribution of awards will be in accordance with W. D. Circular 248.

Missing Parachute

BASE OPERATIONS at the New Orleans Army Air Base reports a parachute missing and requests that Air Force organizations inventory parachutes at their stations. If Type S-1 No. 39-2834 chute is located, it is requested that it be returned to the Sub-Depot Supply Officer, 48th Sub-Depot, Kelly Field, Texas.

Forbidden Fruit

IN THE December issue we devoted an article to the boys who insist on wearing military uniforms despite the fact they're not in the service. We've been asked to add that women—wives, sweethearts, mothers, sisters—are also offenders in their wearing of military insignia, and that Air Force wings and lapel buttons too often assume the status of fraternity pins.

It seems that the law applies to the ladies as well as the men in prescribing a fine up to $300 and/or imprisonment for any person not an officer or enlisted man of the armed forces convicted of wearing the duly prescribed uniform "or any distinctive part of such uniform."

Bombardment on Display

A PHOTOGRAPHIC EXHIBIT, graphically showing the devastation wrought by bombers of the Royal Air Force on industrial areas and transportation centers in Axis-controlled cities of Europe, has been on display recently at the War Department in Washington.

The scenes were recorded by RAF photo-reconnaissance planes, sometimes within a few hours after big raids. Shown in unusual detail is the devastation at Lubeck, Bremen and Osnabruck; the shambles left by block-busters and incendiaries at Wilhelmshaven, Dusseldorf and Cologne, and the damage done at several French and Italian ports.

Squadron Leader G. A. Morris, chief of photographic interpretation for the RAF Bomber Command, accompanied the exhibit to Washington. He explained that its primary purpose was to show the expediency of attacking production at its source, rather than waiting to destroy the weapons of war after they had reached the battlefronts.

—THE EDITOR.

LETTER HOME

By Captain Thomas G. Lanphier, Jr.

The writer of this letter is a member of an AAF fighter group in the New Caledonia area. His father is Lt. Col. Thomas G. Lanphier, Chief of the North American Theater for Air, Military Intelligence, G-2.

December, 1942.

Mother and Dad:

Still in the pink and finding the time passes quickly at last. Back in —— after we'd attained a certain ability and experience we all felt we were marking time—and wasting time.

Up here we are doing what we've been trained all this while to do—and in the short week we've been here we've helped the cause no little. You're doubtless reading of our daily efforts in the line—I've gotten in fourteen hours of combat in the air—not all of that is fighting of course, most of it is getting to and fro. We are no longer outnumbered and poorly equipped—we're well set up and have lots of company.

It's the same old story it has been in other wars—some few of the lads have too much imagination and aren't of much use but the great majority go at it hell-for-leather, which is best. Our opposition can't seem to cope with aggression—we've been quite successful in bulling right into them and scattering them to the four winds.

Things are much better all around here—than they used to be. Living conditions are halfway decent and we get enough rest now that we aren't harassed the way they used to be here.

We are, of course, fighting a different sort of war than are the men in the trenches—and the effects (whatever they're supposed to be) of battle don't show on the pilots the way they do on the foot soldiers.

Our flying units are pretty much the same thing a fraternity house used to be—all young men, few of these the grim and "hard bitten" characters *Time* loves to depict. Most of the flyers here have been my cohorts, on and off, since we left the States—a lot of them I went to school with, back in training days.

We lose a boy now and then but it's rare that a pilot fails to get back to our base, even when shot down. Things move pretty swiftly and we don't seem to feel the concern we might feel at other times—when one of them fails to return. Can't afford to, I guess.

The thing that impresses me is the way almost all of our pilots—the loud ones and the quiet ones, the hard ones and the soft ones—stick together when it gets rough upstairs. That's our saving factor and one the other people don't utilize very much. We stick together and work together and it pays dividends.

I've been flying in front of four and eight men on all my flights—I worried at first about the responsibility but things have worked out so that we've all come back from every flight—and did a lot of damage to the other team while at it—so I don't fret about it much anymore. I destroyed two planes on the ground the other day. They don't count on the "record" as victories—but they'll never fly again which is what counts. All the business about "how many Japs did so and so get"—is pretty much nonsense.

There are men here who'll have hundreds of hours in combat—good men, the best—who only have one or two Nip planes to their credit. But God only knows how many guns they've wiped out strafing, how many ships they've sunk dive bombing—how far and how well they've led their men out and *back* safely. Some seem to have the good fortune to find opposition and get a good crack at them—others fly for hours and never get a shot.

I, and the people with me, seem to have the knack of finding excitement—two of us have planes shot down to our credit and the whole outfit has played hell on several occasions with the Nip cause.

The types of flying and fighting we're doing are myriad—some of it things never dreamed of in training schools or home guard squadrons and a pilot girded for a flight is a sight to see. There is no distinguishing uniform—everyone wears what best suits him—but all wear enough to cover them from head to foot—tropical heat regardless—in case of fire.

A helmet and goggles, a radio headset, an oxygen mask, a throat mike, a life vest, a parachute (in which every kind of first aid and emergency ration is stored somehow), a hunting knife, a gun in a shoulder strap (for comfort in the cramped cockpit), a watch, dog tags, heavy shoes, gloves, pockets full of miscellaneous items and coins (for largesse to natives; in case of emergency the natives will help unbelievably for a shilling or less).

My uniform aground is a fatigue hat—fatigue jacket and trousers and a canteen—we must drink close to a gallon of water per man per day. Baths are scarce but drinking water is everywhere—and has to be. Salt tablets every hour are routine—vitamin and atebrine pills a daily dose and effective too. We all feel better here than we did in ————, lassitude got us there soon after we arrived. Doing nothing, day after day—as we were there—is the hardest thing of all to endure.

We're actually "eager"—as they say here—and are going at the business hard and fast. I don't know how we'll feel a month from now—but along about then we should be pulling out for a rest (that's the policy here now)—so it shouldn't be bad.

If Charles gets down here he'll be in rare company—the marine pilots are really good—and fine fellows. They're deadly shots—they've had hours of practice the Army somehow hasn't managed to give its pilots. Most start off with a bang and keep it up—most Army pilots have to learn their shooting in combat. They catch on quickly, but they ought to have the practice before they get here—as do the Marines.

I expect a couple of turns up here—an interval of rest between them—and then home!!!! I don't imagine they'll let us stay in the States forever—when we *do* get home—but a few months is all any of us ask.

I sometimes wonder if people well established at home fully appreciate what they have. The one thing above all else that every man out here longs for—is a sight of home and the ones he loves.

I feel, now, that I'm earning my chance to go home. However long they keep me here is all right—things are being accomplished here and there's a feeling of getting a job done throughout.

I want you all to know that I'm well and well fortified to fight my little corner of the war.

My love to you all.

Tom

WHAT YO

The author of the accompanying article leaves his kite after a mission over El Alamein.

Combat horse sense from a P-40 pilot who fought with the RAF during the big push in North Africa.

HYPO SQUAD flew at 11,000 feet as high cover to Borax squadron, flying just below us with the Wing Commander leading. Dust and haze had made it thick all the way up to 10,000 feet and we felt better as we climbed to 15,000. Our silhouettes would not stand out so prominently against the soup below.

As we neared the bomb line five tiny dots suddenly broke the haze way off to our right. "Borax and Hypo Squadrons, five 109s at 3:00 o'clock below. Let's keep our eyes on them," called the Wing Commander. There was going to be trouble this trip, we thought; they're coming up too early. Oh well, easy come, easy go. Our weaving changed from a regular pattern to a violent and shifty motion and we bit large washers out of our parachutes.

As the 109s climbed up and around in back of us they became more difficult to see. They changed from tiny black dots against the haze to tiny light blue specks, and then finally disappeared into the sun about 3,000 feet above. We knew of their presence there only from the occasional flash of the sun reflecting off their perspex.

"All right, boys, they're in the sun now. They'll be coming down. Hypo top cover. Be ready!"

We went on toward the target. They were there, we knew, even though we couldn't see them. Just as we arrived at the motor transport concentration we were to bomb, five or six more tiny blue dots appeared overhead and down sun from us. They came in closer and we saw them dip their wings as they watched our movements.

"Ach, Herman," their leader was probably saying, "A Hurricane party! This will be easy meat. It iss my turn first."

The Hun has taken a long while to realize the sting a P-40 carries. He comes down on what he thinks is a Hurricane and then when he gets shot down he swears it was a Spitfire that did it.

"There's five, six more above at 12:00 o'clock," says the Wing Commander.

SEE WON'T HURT YOU

By LIEUT. CHARLES W. TRIBKEN, JR.
U. S. Army Air Forces

"Hypo Squadron, stay above as top cover. Borax squadron peel off and bomb! Going down!"

We stayed above and watched the 109s more carefully than ever. As Borax squadron went down the 109s became more noticeably excited. Two of the down-sun party detached themselves and made a feint after the tail men of Borax as they were bombing.

"Two coming down on you, Borax green," said our squadron leader. "They're O.K.!" called the Wing C.O. who had already pulled out of his dive and was climbing back up to us. "Don't go after them!"

The other four that were down-sun started to come down on our top section.

Coming down on you Hypo top! Get ready! Turn about! And as they turned the other Huns came down from the sun. We in the bottom section had not turned, however, and we met them head-on. When they saw that we were prepared for them they continued straight down. Someone had put in a lucky burst and a 109 was trailing smoke. Everything was a shambles now. Just a cloud of aircraft whirling around. We in the top cover had jettisoned our bombs as we were attacked. The Wing Commander called, waggled his wings, and we re-formed and went home. We all had enjoyed it and no one had picked up a scratch.

That describes a more or less typical mission in the desert. It was moderately successful, because even though we were attacked we managed to get at least half our bombs on the objective and the other half might also have done a little damage. We were not out to shoot down the enemy, but we had probably destroyed one with no loss to ourselves.

It might not sound very brave or daring, but from long experience we had found that the "brave and daring" man may be missing after a few shows. He runs off after the Hun and finds himself in a most embarrassing, out-numbered position, and if he does manage to return he is pretty well holed up and much less daring.

I have tried to illustrate what a show is like and what you may expect to see. The Hun is always 2,000 feet or so above. The German and Italian fighters can out-climb you. But they cannot out-dive or out-maneuver the P-40. So you must make them fight where your superior characteristics will be put to use. Allied fighters depend on various types of defensive formations and have achieved great success with them.

PLEASE note that the entire success of this operation depended upon the fact that we saw and knew exactly what the Hun was doing all the time. If he had been able to catch us unawares, we would have been attacked and broken up with losses long before we reached our objective. However, he knew that we knew he was there and, as a result, we made him play his best strategy and still he failed. All because the Wing Commander and the squadron knew what was going on.

See him before he attacks! This cannot be stressed enough. The man who gets shot down is the man who goes out on mission after mission and sees nothing, or only half of what is going on. He leads a happy life because he never realizes his danger. Perhaps he's watching a good tank battle on the ground or a pretty peasant girl milking a cow (and she waved to him—how sweet). But he missed the fact that Emil and Heinrich and Ludwig are up above him arguing to beat hell as to who should have the first crack. (Emil has had first chance for two times running and it isn't fair.)

If he should be lucky and manage to get shot down on the right side of the lines he'll say, "Well, the first thing I knew there was some white stuff going past my wings and then I was on fire and so I jumped out. Can't I get a flying boot for that? I walked a mile before I was picked up." By this time his commanding officer is fuming to himself. ("Why the hell did you get shot down and why the hell did you bother to come back at all? Who can I push this guy onto?") But, being a kind hearted soul, he inquires to see if there isn't some scratch or a broken fingernail that the M.O. can use as an excuse to put our hero in the hospital for a month or so.

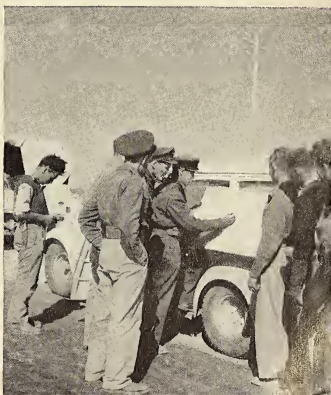
What are you going to see? Not a great deal. Four or five very tiny blue or black dots, in sort of a rough line astern or more probably (and you really shake when you see this) just as a flash in the area of the sun. They're up there and they see you! Recognize them as Huns even though you don't see their wing tips or tail or spinner. In Africa all Allied (Continued on Page 32)

PHOTOGRAPHS BY THE AUTHOR

Even the Squadron Leader sometimes was caught unawares. Note the scars left by a 20 mm. cannon shell and machine gun bullets (holes circled).

Inspecting a Stuka left behind by the retreating Germans. Such planes are used to bring up supplies from the rear.

An intelligence officer interviews a group of RAF fighter pilots who have just returned from a mission over enemy territory.



WHAT YOU SEE WO

Combat horse sense from a P-40 pilot who fought with the RAF during the big push in North Africa.

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HYPO SQUAD flew at 11,000 feet as high cover to Borax squadron, flying just below us with the Wing Commander leading. Dust and haze had made it thick all the way up to 10,000 feet and we felt better as we climbed to 15,000. Our silhouettes would not stand out so prominently against the soup below.

As we neared the bomb line five tiny dots suddenly broke the haze way off to our right. "Borax and Hypo Squadrons, five 109s at 3:00 o'clock below. Let's keep our eyes on them," called the Wing Commander. There was going to be trouble this trip, we thought; they're coming up too early. Oh well, easy come, easy go. Our weaving changed from a regular pattern to a violent and shifty motion and we bit large washers out of our parachutes.

As the 109s climbed up and around in back of us they became more difficult to see. They changed from tiny black dots against the haze to tiny light blue specks, and then finally disappeared into the sun about 3,000 feet above. We knew of their presence there only from the occasional flash of the sun reflecting off their perspex.

"All right, boys, they're in the sun now. They'll be coming down. Hypo top cover. Be ready!"

We went on toward the target. They were there, we knew, even though we couldn't see them. Just as we arrived at the motor transport concentration we were to bomb, five or six more tiny blue dots appeared overhead and down sun from us. They came in closer and we saw them dip their wings as they watched our movements.

"Ach, Herman," their leader was probably saying, "A Hurricane party! This will be easy meat. It iss my turn first."

The Hun has taken a long while to realize the sting a P-40 carries. He comes down on what he thinks is a Hurricane and then when he gets shot down he swears it was a Spitfire that did it.

"There's five, six more above at 12:00 o'clock," says the Wing Commander.

"Hypo Squadron, stay above as top cover. Borax squadron peel off and bomb! Going down!"

We stayed above and watched the 109s more carefully than ever. As Borax squadron went down the 109s became more noticeably excited. Two of the down-sun party detached themselves and made a feint after the tail men of Borax as they were bombing.

"Two coming down on you, Borax green," said our squadron leader. "They're O.K.!" called the Wing C.O. who had already pulled out of his dive and was climbing back up to us. "Don't go after them!"

The other four that were down-sun started to come down on our top section.

Coming down on you Hypo top! Get ready! Turn about! And as they turned the other Huns came down from the sun. We in the bottom section had not turned, however, and we met them head-on. When they saw that we were prepared for them they continued straight down. Someone had put in a lucky burst and a 109 was trailing smoke. Everything was a shambles now. Just a cloud of aircraft whirling around. We in the top cover had jettisoned our bombs as we were attacked. The Wing Commander called, waggled his wings, and we re-formed and went home. We all had enjoyed it and no one had picked up a scratch.

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Our Sikorsky helicopter—how it operates and what it might do in warfare

THE ARMY'S *Flying* WINDMILL

By Colonel H. F. Gregory

WRIGHT FIELD

FLYING a designer's dream plane on its first flight is a thrill that only can be eclipsed by flying a designer's "freak", such as the Army's first successful helicopter, through its official flight tests.

It was the privilege of the author to act as project officer for the development and procurement of the Army's first practical and successful helicopter aircraft—a freak that may revolutionize design of the civilian "taxi-plane" of the future.

Nine months ago this wingless craft, after a cross-country flight from the Sikorsky plant at Stratford, Connecticut, parked itself in front of the Wright Field operations tower, not on the line with other aircraft, but hanging 25 feet above the concrete apron. Then, upon receiving clearance to land, the Army Sikorsky Helicopter dropped gently —and vertically—to the ground.

Since that Sunday on May 18, 1942, the flying windmill has gone through eight months of flight testing, demonstration and pilot training at Wright Field. As a result, more of them are scheduled to be built for service testing under field conditions.

The helicopter has emerged from the experimental stage and is ready for the tests that may prove it to be capable of performing a great variety of military missions.

This new aircraft can't attain the speed of a P-47 and it can't carry the load of a Fortress or a Commando. But it can do many things that a liaison plane cannot do.

The helicopter will rise or descend vertically; it will fly forward, backward and sideways, it will spin around on its vertical axis like a top. It will hover motionless in the air at its vertical ceiling or a few feet above the ground; it will land on a platform 20 feet square.

During test flights, the helicopter time after time defied the impossible. In one cross-country trip the visibility dropped to less than one-half *(Continued on Page 29)*

DAWN OF A New Era

The pilot's own story of the helicopter's first cross-country flight in the Western Hemisphere.

The conventional model of the helicopter, piloted by its developer, flies low over o Connecticut meadow with the Army's new model in the background. Note that the Army version has an enclosed cockpit and fully-covered fuselage.

Completing the delivery of the Army's helicopter. Colonel Gregory, author of the article on the opposite poge, greets Mr. Sikorsky at Wright Field. Mr. Orville Wright grins with opproval. In the photo below, Mr. Sikorsky corries on o telephone conversation with the occupants of the helicopter while the oircraft hovers in the oir.

By C. L. MORRIS

ENGINEERING TEST PILOT, SIKORSKY AIRCRAFT DIVISION, UNITED AIRCRAFT CORPORATION

THIS is the chronicle of a new era's birth. It was written in June, 1942, when comparatively few people knew the meaning of the word "helicopter." Many helicopters have been built, but none could be considered successful until 1937 when the craft designed by Professor Focke in Germany astounded the world by flying inside a crowded sports palace. Little has been heard of the German ship during the last three years, but in 1939 Igor Sikorsky, in the United States, undertook to develop a helicopter along quite different lines. In 1940 this craft was demonstrated publicly for the first time. In 1941 Mr. Sikorsky broke the official international endurance records for helicopters. Finally, in 1942, the first U. S. Army helicopter was delivered. This is the story of that delivery flight.

THE story begins on May 13, 1942, in a little triangular meadow close to the Sikorsky Aircraft factory in Stratford, Connecticut. It was a bright morning, slightly on the warm side, with a gentle spring breeze barely stirring the leaves of the stately elms that bordered the field. Grouped along the road were a couple of dozen workers from the plant. Their interest was focused on the aircraft in which I sat, making final arrangements to take off on the first cross-country helicopter flight in the Western Hemisphere, and the world's first delivery flight of a helicopter, as far as we know. It was a flight in which records were destined to be broken—but the records would not be recorded because we were forced to cloak this occasion in secrecy.

I sat inside the blunt-nosed cabin, reading the instruments that would tell me when all was ready, arranging maps and parachute harness, and watching the rotor flicking overhead in powerful rhythm.

Several of my friends drifted out of the crowd and stuck a farewell hand in the open window. Mr. Sikorsky stood nearby, nervously chewing at the corner of his mouth. His keen eyes flashed from under the familiar gray fedora as they searched every detail of the craft to detect any sign of flaw that might develop.

I knew on this May morning that his vision would be doubly sharp. Mr. Sikorsky was not wholly convinced of the wisdom of this flight; he felt that this "first-of-the-type" should be handled with kid gloves and be delivered to Dayton by higway truck, thus eliminating the potential hazards of a cross-country flight in a totally novel type of aircraft that had had less than twenty flying hours since its wheels first left the ground.

It is understandable, therefore, that I experienced calm reassurance when Mr. Sikorsky walked quickly to the ship, thrust out his hand and said, "Well, Les, today you are making history!"

The engine labored and roared its crescendo as I pulled upward on the pitch control to rise off the ground. The ship lifted vertically to ten or fifteen feet; then I eased forward on the stick and we started off across the field. Sweeping in a gentle circle, we swooped low over the clump of upturned faces and waving hands—then on over the factory in an easy climb to 1,500 feet.

An automobile with a large yellow dot painted on its roof was already speeding out of the factory gate. That car was to be my shadow for five days. In it were Bob Labensky, the project engineer who had cast his lot with the penniless Sikorsky of nineteen years ago; Ralph Alex, his assistant, who had labored endless days and nights to bring this craft to flying condition; Adolph Plenefisch, shop foreman, who had all but lived with the Sikorsky helicopter since the first nerve-wracking flights in 1939; and Ed Beatty, transportation chief, who had elected himself to be the driver.

I quickly lost them in the elm-tunnels of Stratford, but my maps were marked with the exact route they would take, so I followed it closely, always ready to land in some little field beside the road should the slightest thing go wrong. They would see me as they drove by, and delays would be minimized.

Danbury came in sight a little behind schedule. I was flying at 2,000 feet now because the land was rising. At that altitude a moderate headwind was slowing my speed. Sixty miles an hour had been chosen as the best cruising air speed for the flight—easy on both ship and pilot. A fifteen-mile headwind made a big

(Continued on Page 38)

Our Sikorsky helicopter — how it operates and what it might do in warfare

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Checking and Double-Checking Navigation Devices

By Colonel Thomas L. Thurlow

ENGINEERING DIVISION, WRIGHT FIELD

PET devices, intended by their inventors to eliminate all mechanical and human errors in navigating the skyways, are sparking the research of the instrument laboratories at Wright Field.

Never satisfied with the "best," laboratory technicians continually examine and test each new device submitted, regardless of the experience of the inventor. Although hundreds are discarded, some few are proved practical by the triple-standard of accuracy, economy and speed of operation.

In this sifting process many superficially "perfect" devices turn out to be absolute duds for combat flying where the navigator must make his computations under extremely difficult conditions. Wright Field's job is to spot the phony systems and to encourage development of the ones that can be depended upon to bring our planes home.

Despite the intricacies of this mathematical science, it is encouraging to note that some of the most promising improvements in devices to aid navigators are being submitted by non-navigators. Recently a synchronous ground speed meter was developed by an officer of the Medical Corps and, of the many hundreds that have been submitted, his is the only one that has proved to be novel in working principle.

As soon as installation of another device —which determines altitude above the terrain—is completed in more airplanes, the medico's synchronous ground speed meter will be put through the final tests that may prove it to be practical.

The mechanical devices for the reduction of observations comprise a group that primarily attracts the inventive prowess of non-navigators. Because only geometry and common sense are involved, the ambitious would-be navigators frequently slip into ruts that brand their instruments as "phonies."

The geometry of the inventor often breaks down in making computations; sometimes he founders on the problems of "scale"; invariably his enthusiasm for his own creation tempts him to make outlandish claims as to the speed and accuracy possible with the device.

Such people usually have just discovered navigation—yet, all of the devices they propose can be seen in any museum of astronomy.

What an amateur proposes as a new and original short-cut method often is found to be a system previously tried and rejected. Some of the new proposals are sound for training and for certain types of flying conditions. The only systems that can be adopted, however, are those that serve the navigator under all flight conditions, those that require less than four minutes of computation, and those that can be economically constructed, installed and maintained.

All devices using arcs to represent the various circles, celestial and terrestrial (involved in the reduction of sights), are essentially alike in principle. Such an instru-

ment is pictured on Page 33. The navigator tyro or old-timer, who has not toyed with the idea of designing and constructing a simpler and better device for the solution of the oft-met wind triangle, for the plotting of lines of position, or for the reduction of celestial observations, is indeed much harder to find than Diogenes' "Honest Man." In many cases, the navigator whittles his pet device from a sheet of celluloid or a piece of brass, convinced that his invention will end all navigation devices. He then begins his crusade to gather converts.

Despite the flood of such inventions, the Materiel Center at Wright Field welcomes the steady stream of proposals. Although hundreds of devices are screened, the value of the few devices that have practical features compensate many times over for the effort expended to uncover them. In addition to tangible developments, new ideas and new methods proposed serve as stimulants for the extensive research continually being carried out in the laboratories.

Navigation, as an ancient art, has attracted the attention and thought of countless thousands for centuries. Because the field has been so extensively exploited, innovations do not appear with great frequency. However, they appear. The Air Almanac is an outstanding example.

THE Air Almanac is believed to be one of the greatest contributions to navigation in several decades. It has transformed celestial navigation from a very painful art to a near painless one. It has popularized the lunar observation—rarely attempted before appearance of the publication. It has made the daylight fix by two bodies possible during those portions of the month when the moon is visible and well located.

Synchronous ground speed meters, which are proposed every week, may vary in external appearance but in principle they are as alike as peas in a pod. Yet, it took a non-navigator, the medical officer previously mentioned, to develop an instrument with a new working principle.

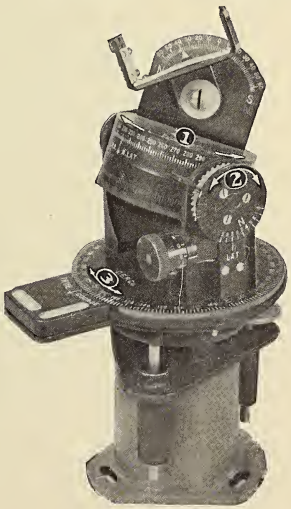
In the design of devices for the solution of the wind triangle, wind star problems, or of equipment for line of position or other plotting, there are few pitfalls to be encountered. Hence computers and plotting equipment of every conceivable type are submitted in astronomical numbers. The criteria for acceptance must be based upon many factors; for instance, the curves of cost vs. utility are of primary importance. More than 100,000 of the standard E-6B dead reckoning computers have been purchased and adopted for general use in the service and navigation schools. To change the type would involve a change in the navigation school curriculum, the junking of the present instrument, the writing of Specifications and Technical Orders covering the new device, the initiation of procurement of the new computer, and, most serious of all, a time delay of many months in getting the device into production and delivered to service units. Therefore, the new computer must be so completely superior to present equipment that it would render the device it supersedes obsolete before it could be adopted to replace the satisfactory computer already being used.

The trick devices get a thorough testing but almost all fall short of high Air Force standards.

Inventors who develop drift and ground speed meters other than the visual type run into trouble in a big hurry. Two such types are the integrating accelerometer and those devices which attempt to utilize the vertical component of the earth's magnetic field.

To determine ground-speed and drift by integrating the horizontal accelerations encountered by an aircraft in flight, the inventor must succeed in construction of an accelerometer that will measure all accelerations, from the most minute to the most violent. To date none have been constructed. Accelerations must be measured with almost prohibitive exactness because the error in the final computation—ground speed—*is cumulative*. Since only horizontal accelerations can be used, the device also must be gyro-stabilized. However, when an accelerations occurs, the accelerometer becomes unbalanced and processes the gyro upon which it is mounted until the horizontal component is no longer being measured. In addition to the foregoing difficulties, accelerations must be integrated instantaneously—or with an invariable lag. Electric motors, watt-hour-meters and similar devices are impractical because of the inertia of their rotating parts. Assuming that all of the other difficulties can be overcome, how then is instantaneous continuous integrating to be accomplished?

AAF Type G-1 Astro-Compass



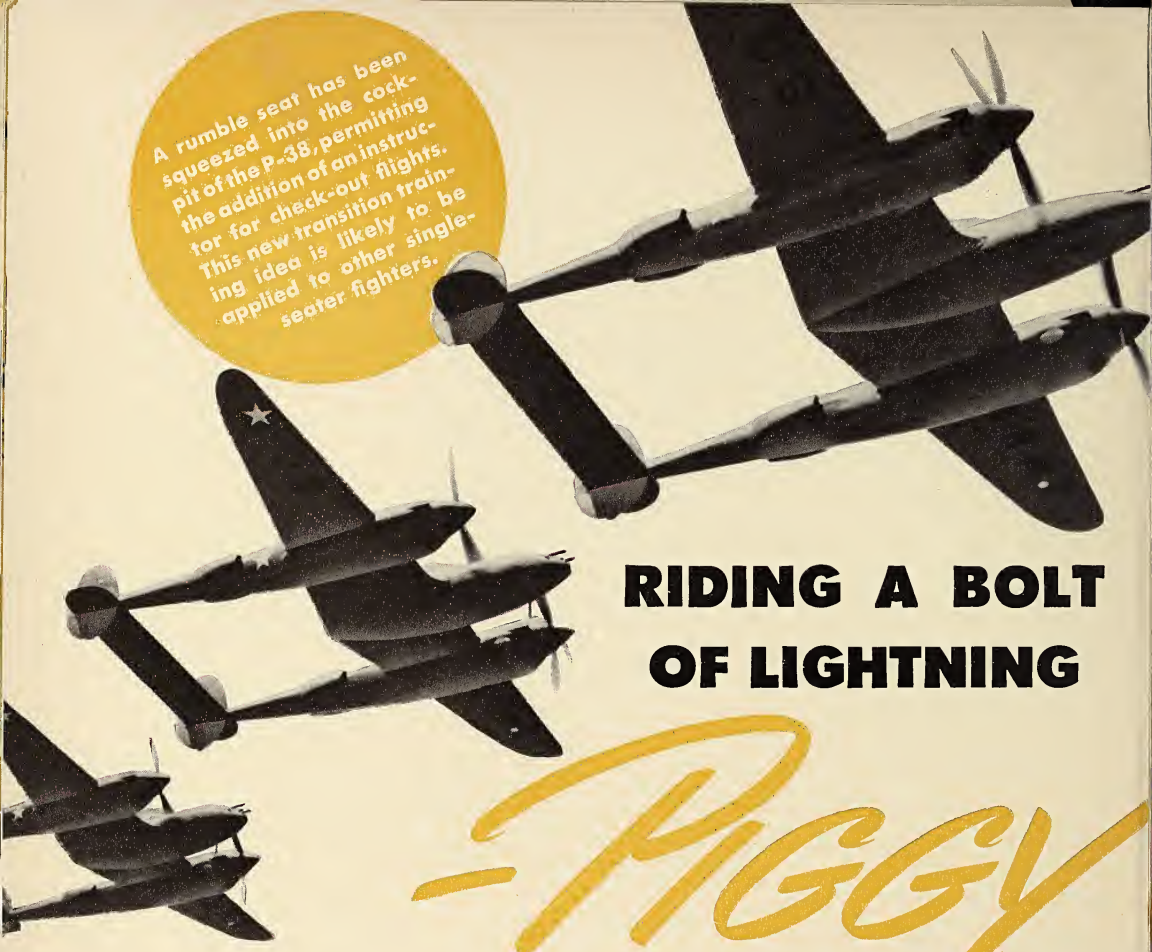
Many proposals have been submitted to determine ground speed by measuring the charge produced in a horizontal conductor moved through the earth's magnetic field (using the vertical component thereof). The theory is that "lines of force are cut and therefore a charge is produced in the conductor"; hence "measure the charge and there is the ground speed."

To astound the inventor of this type of ground speed device (and the reader alike), it can be stated that "there are no lines of force to cut." Such a statement deserves an explanation.

IT is agreed that the earth's magnetic field in a small cube is uniform. Let it then be stated that the well-known "lines of force" do not exist at all but are used as a *convenient analogy* to show the "direction" or "flow" of a perfectly uniform magnetic field, and to offer an explanation of what happens when a conductor moves through it. Thus the earth's field is likened to a small cube of sea water which is entirely uniform but has a quality of "direction" which we indicate by "lines of force." Now, if no lines of force are cut, why then is a current induced in a loop rotated in the earth's field? The answer to this question conforms entirely to physical realities: "The current induced is due entirely to the *variation of the amount of flux* (with due regard to 'direction') enclosed by the loop, which variation results from the rotation of the loop." Thus, the induction is due to a *change in flux density* in the loop and not to the cutting of lines of force. Furthermore, since there is no alteration of flux density when a single conductor or a *non-rotating* loop is moved through a uniform field (such as the earth's), no charge or current is generated.

The lines-of-force advocate admits that no current is generated in a translated, non-rotating loop, maintaining that opposing e.m.f.'s counteract each other. His opponent argues that there is no change of flux density and hence no current generated. Both agree in regard to the final result in the case of the loop. They disagree in regard to the single conductor, one maintaining that a charge is developed and the other that one is not. When an attempt is made to measure the charge, the circuit is closed, the conductor becomes a loop and there is no current flow, as both contestants have agreed. Hence, no ground speed.

Perhaps some of the above argument is sacrilege. It illustrates, however, that the inventor proposing to use the earth's magnetic field must tread on solid ground as far as fundamental physical conceptions are concerned. In other types of non-visual ground speed meters the inventor is quite likely to find himself involved in a morass of mechanics. This is especially true when gyros are involved. Very frequently the designers of the "arc" group of instruments become so thoroughly involved in their celestial and terrestrial geometry and so confused thereby that they eventually claim a fix from one ob- *(Continued on Page 33)*



A rumble seat has been squeezed into the cockpit of the P-38, permitting the addition of an instructor for check-out flights. This new transition training idea is likely to be applied to other single-seater fighters.

RIDING A BOLT OF LIGHTNING -PIGGY

By LIEUT. JOHN TRUESDELL
DIRECTORATE OF FLYING SAFETY

PIGGY-BACK riding in the speedy P-38 is the latest wrinkle being sponsored by the Directorate of Flying Safety for our air cadets.

The term piggy-back applies to a new two-seat arrangement in the small single-seat cockpit of the 38. With this conversion, the extra rider sits above and close behind the pilot and actually looks like he's riding piggy-back on the pilot's shoulders.

Take it from one who has had his first passenger piggy-back ride in a P-38—it really looks good. It's one thing to spend a day with the Lockheed engineers listening to performance data, but it's another thing to wedge into the capsule cockpit of the 38 with a headful of figures and to feel those figures with the seat of your pants.

This P-38 conversion, however, has earned its flying spurs for a far better reason than to prove that the ship is one of our finest air weapons. Riding piggy-back with a pilot who fully understands and can demonstrate the abilities of this fast fighter, the cadet can learn more in an hour's ride than he might in months of experimenting while flying the P-38 solo. He actually has the composite of all the experiences of the Lockheed test pilots and test engineers who lived, dreamed and rode with the ship from the drawing board on up.

Soon the Air Forces will have a number of P-38 piggy-back conversions—first to check out flight instructors, and then for flight instructors to check out cadets before they graduate to this fighter.

In this piggy-back program for the P-38, and for other single seater fighters as well, the Directorate of Flying Safety sees not only the possibility of a speed-up in turning out the finest fighter pilots in the world, but a most effective psychological weapon to combat the wild and wooly tales you sometimes hear about our new fighters.

This simple method of achieving pilot acquaintanceship with a single-seater plane had a very basic beginning. It all started one afternoon early last August when Milo Burcham, Chief Engineering Test Pilot at Lockheed, was removing the radio from the shelf behind the pilot's seat of a P-38.

Burcham decided a small to medium-sized man could conceivably wedge himself on that shelf, and he discussed its possibiliy with Rudy Thoren, Lockheed's Chief Flight Test Engineer. Now, Rudy is six feet two inches without stretching and for the first time in his life he regretted his height. At any rate, he and Milo soon were giving a careful eye to that small space in the P-38's cockpit designed for a radio rather than a rangy engineer.

Rudy made up his mind that if a road

map could fold so could he, and he was soon back at his drawing board designing a plywood seat and pocket-size desk; he managed to save enough cockpit space for all the known engineering instruments as well as several more that had been in the back of his mind for some time. Rudy was the first piggy-back passenger, with Milo putting the ship through every possible maneuver while this elongated flying engineer managed to divide his mental capabilities evenly between dozens of test instruments and keep his lunch inside him. This original trip evolved into daily flights and the highly guarded first piggy-back P-38 went to work as a complete flying engineering laboratory.

These sorties for aerodynamic science went on and up until finally Rudy and Milo were nipping along at well above 30,000 feet, recording new performance figures. This test pilot and engineer continued their flights until they knew the P-38 from A to Z.

The Directorate of Flying Safety entered the picture in the persons of Lieutenant Colonel Warren Carey, Commanding Officer of the Sixth Regional Safety Office, and Lieutenant Colonel Charles H. Hastings, Jr. Reluctant to share the credit for visualizing the possibilities of pilot indoctrination with the piggy-back P-38, Colonels Carey and Hastings insist that the idea "simply evolved" between Lockheed's Milo Burcham, themselves and progressive Commanding Officers who were approached. The credit-reluctant Lockheed gang and the Air Force officers do agree that if it hadn't been for Major General Barney Giles, commanding the Fourth Air Force, piggy-back pilot training might be just another good idea that never saw the light of day.

JIMMIE MATTERN, another Lockheed Test Pilot, took General Giles and Brigadier General William E. Kepner for their first piggy-back ride.

"I didn't spare the Generals a thing," claims Jimmie. "We did loops, rolls, Immelmans, single engine rolls, single engine take-offs and landings, accelerated stalls, and all the other so-called 'unknowns' that had caused a lot of hangar talk about the ship's performance."

Jimmie points out that Milo Burcham and Rudy Thoren took their first ride in August, and by September the Army Air Forces was already busy converting some of its own equipment to piggy-back for use in building confidence and skill in new pilots.

Jimmie, who has flown his 10,000 hours under all conditions, in all kinds of airplanes, all over the world, says: "Trouble in a P-38 (or in any other ship) is usually something that the pilot gets himself and his airplane into rather than the airplane getting the pilot into it." Jimmie claims that a lot of hangar hot air has sprung up about a single engine performance.

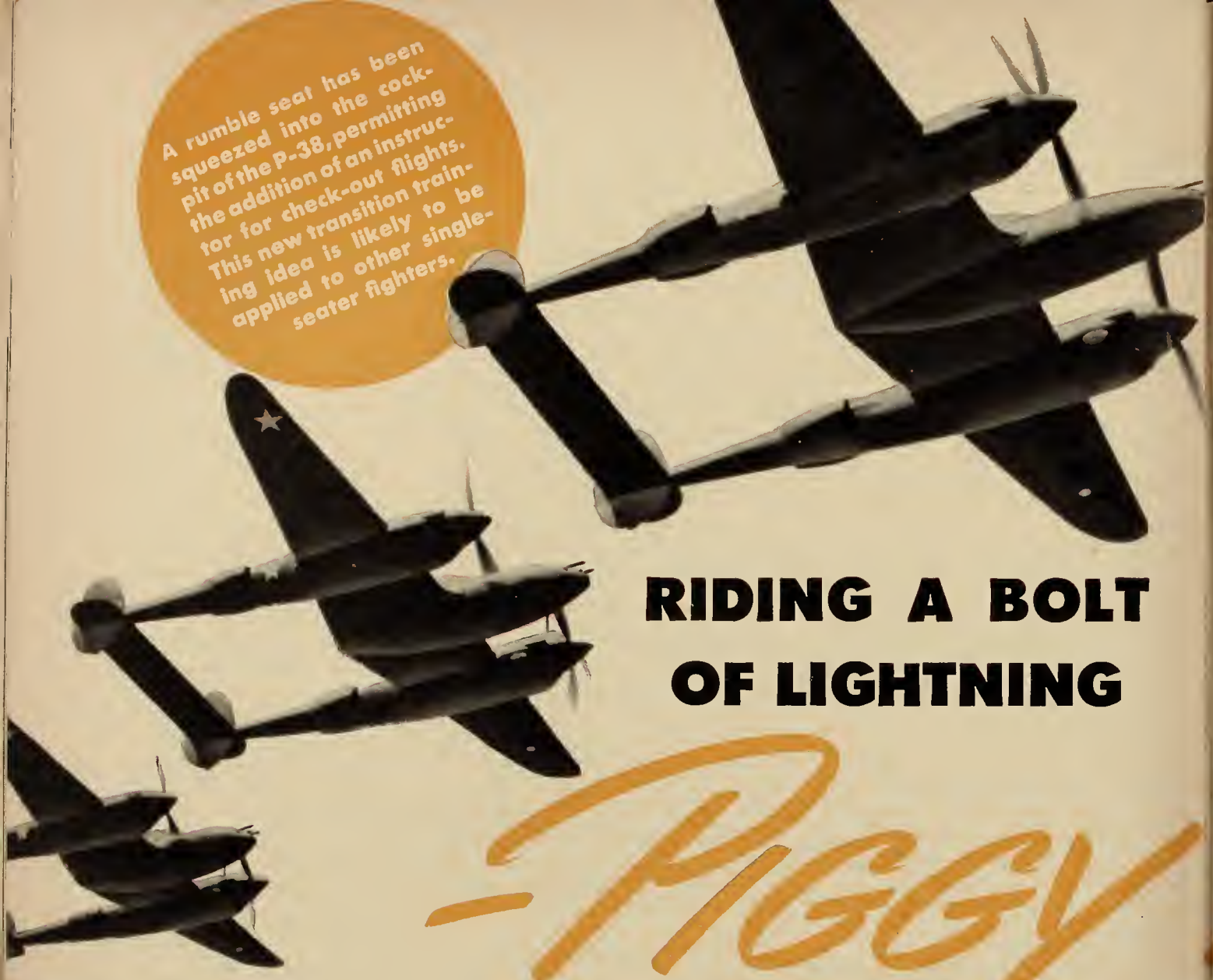
"The P-38 flies easily," he explains, "at better than 180 m.p.h. on one engine. That's faster than I ever flew in my first fifteen years of flying. On single engine the Army recommends an air speed of not less than 120 m.p.h. although actually, the ship will fly slower with complete safety."

Jimmie continues that one of the main facts concerning single engine operation is *the importance of considering air speed above everything* in event of motor failure. Pilots with only single engine experience have a natural tendency to pour the coal into the live engine, when the first thought should be *to gain flying speed* by putting the nose down and maintaining directional control even if it means throttling back the remaining live motor. Then the usual single engine procedure is to be considered and quickly and coolly executed. Loss of directional control with a sudden increase on the power of the one remaining engine can "flip the ship on its back." Jimmie cautions, however, that a thorough knowledge of single engine procedure as outlined by your check list is far more important than vaguely knowing "what to do."

"If the cadet knows this, he is perfectly safe on one engine even at the critical take-off period. All this one-engine talk might seem superfluous because the ship is designed with two engines, but as long as they make motors, there will be occasional motor failures.

"The accelerated stall is another important lesson for the piggy-back pilot to demonstrate thoroughly. At high speeds it's possible to haul back on the stick, spill the air off the wings of the P-38, and achieve an accelerated stall. Once the pilot has his first easy lesson on recovery from these stalls (just ease off on the stick) and how to avoid them in the first place, another bit of hangar rumor goes into the scrap drive." ☆

Lockheed's Milo Burcham, chief engineering test pilot, and six-foot-two Rudy Thoren, chief flight test engineer, show how two big fellows fit into the converted P-38 cockpit. Below are details of the construction.



A rumble seat has been squeezed into the cockpit of the P-38, permitting the addition of an instructor for check-out flights. This new transition training idea is likely to be applied to other single-seater fighters.

RIDING A BOLT OF LIGHTNING

-Piggy-Back

By **LIEUT. JOHN TRUESDELL**
DIRECTORATE OF FLYING SAFETY

PIGGY-BACK riding in the speedy P-38 is the latest wrinkle being sponsored by the Directorate of Flying Safety for our air cadets.

The term piggy-back applies to a new two-seat arrangement in the small single-seat cockpit of the 38. With this conversion, the extra rider sits above and close behind the pilot and actually looks like he's riding piggy-back on the pilot's shoulders.

Take it from one who has had his first passenger piggy-back ride in a P-38—it really looks good. It's one thing to spend a day with the Lockheed engineers listening to performance data, but it's another thing to wedge into the capsule cockpit of the 38 with a headful of figures and to feel those figures with the seat of your pants.

This P-38 conversion, however, has earned its flying spurs for a far better reason than to prove that the ship is one of our finest air weapons. Riding piggy-back with a pilot who fully understands and can demonstrate the abilities of this fast fighter, the cadet can learn more in an hour's ride than he might in months of experimenting while flying the P-38 solo. He actually has the composite of all the experiences of the Lockheed test pilots and test engineers who lived, dreamed and rode with the ship from the drawing board on up.

Soon the Air Forces will have a number of P-38 piggy-back conversions—first to check out flight instructors, and then for flight instructors to check out cadets before they graduate to this fighter.

In this piggy-back program for the P-38, and for other single seater fighters as well, the Directorate of Flying Safety sees not only the possibility of a speed-up in turning out the finest fighter pilots in the world, but a most effective psychological weapon to combat the wild and wooly tales you sometimes hear about our new fighters.

This simple method of achieving pilot acquaintanceship with a single-seater plane had a very basic beginning. It all started one afternoon early last August when Milo Burcham, Chief Engineering Test Pilot at Lockheed, was removing the radio from the shelf behind the pilot's seat of a P-38.

Burcham decided a small to medium-sized man could conceivably wedge himself on that shelf, and he discussed its possibiliy with Rudy Thoren, Lockheed's Chief Flight Test Engineer. Now, Rudy is six feet two inches without stretching and for the first time in his life he regretted his height. At any rate, he and Milo soon were giving a careful eye to that small space in the P-38's cockpit designed for a radio rather than a rangy engineer.

Rudy made up his mind that if a road map could fold so could he, and he wa soon back at his drawing board designin a plywood seat and pocket-size desk; h managed to save enough cockpit space fo all the known engineering instruments a well as several more that had been in th back of his mind for some time. Rud was the first piggy-back passenger, wit Milo putting the ship through every pos sible maneuver while this elongated flyin engineer managed to divide his mental ca pabilities evenly between dozens of test in struments and keep his lunch inside him This original trip evolved into daily flight and the highly guarded first piggy-bac P-38 went to work as a complete flying en gineering laboratory.

These sorties for aerodynamic scienc went on and up until finally Rudy an Milo were nipping along at well abov 30,000 feet, recording new performanc figures. This test pilot and engineer con tinued their flights until they knew the P-3 from A to Z.

The Directorate of Flying Safety en tered the picture in the persons of Lieu tenant Colonel Warren Carey, Command ing Officer of the Sixth Regional Safet Office, and Lieutenant Colonel Charles H Hastings, Jr. Reluctant to share the credi for visualizing the possibilities of pilot in doctrination with the piggy-back P-38

The Meaning of Flight Control

The director of a new unit in the Air Forces explains its operation and the effect it will have on pilots throughout the country.

By Lieut. Col. George C. Price

DIRECTOR OF FLIGHT CONTROL, ARMY AIR FORCES

IF there is one thing that makes a military pilot see red it is to tell him he is going to be controlled. True, he has been in the Army and knows all about having his time regimented. But most of us who learned our flying a few years back have been pretty much the boss of our own actions once we cleared a runway.

And now Army pilots are face to face with a new animal called Flight Control. At first glance it is a pretty ornery looking beast. When you have been flying everything with wings on it for a few years, you feel that about the last thing you need is more control—you may be right, too. No system of operation could be devised that would make allowances for all the degrees of experience and ability that we have in the Army Air Force today. But where there used to be a handful of pilots with a lot of experience and ability, there are now thousands of youngsters in the air with more guts than experience.

These youngsters represent the bulk of the Air Forces today, so once again the majority rules. Either that or you could expect to have a lot more airplanes cracking up in the cornfields of the country.

Actually, this thing we call Flight Control isn't such a bad critter once you get to know it. The older airline pilots squawked to high heaven when they were introduced to Flight Control, too, but there are very few of them who would care to be without it these days.

While details remain to be worked out, we can tell now about how the system is going to work and what it will do for you and me when we want to go from here to there.

The two places where Flight Control will be most obvious are in the operations offices and in flight on the airways.

As far as operations are concerned, Flight Control means only this. The Director of Flight Control will prescribe the procedures to be followed in operations offices and will operate an inspection service in line with those procedures.

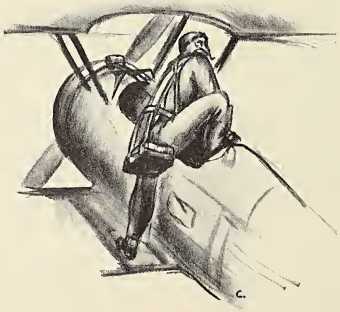
In other words, it is our job to see that everything a pilot needs to plan his flight is on hand and easily available in every operations office, including maps, weather, latest special notices to airmen and other information. It is our job to figure out what information should be there and then see that it is. Actually there won't be any considerable change in the forms you fill out or in the information you give. There will be no sudden turnover in what you have to do to get an operations clearance (Form 23).

What will happen is that the whole present procedure will be tightened up where the records and inspection show that looseness has caused accidents. The average pilot will be aware of the change only in that there will be more and better information available for him and he will be better equipped and informed for the mission ahead.

So far as Airways Traffic Control clearances are concerned, no changes of any kind are scheduled. You will get your clearance just as you do now. As now, you will report time-over at range stations along the way, but for the benefit of those who have been a little forgetful about these reports, it is going to be absolutely necessary to make them as scheduled.

Right here is where the biggest change comes in. Formerly you could report to range stations every five minutes for a thousand miles and suddenly find yourself at your destination with 200-foot ceiling and a quarter-mile visibility.

Surely, you could ask for weather and find out that ceiling was "Dog," visibility, "Horse," and a few other barnyard varieties. But pilots are pilots and more often than not we let the weather take care of itself — pretty well convinced that we can take care of ourselves. Besides, it is too much trouble to try to figure out the code unless we are already in a pickle.

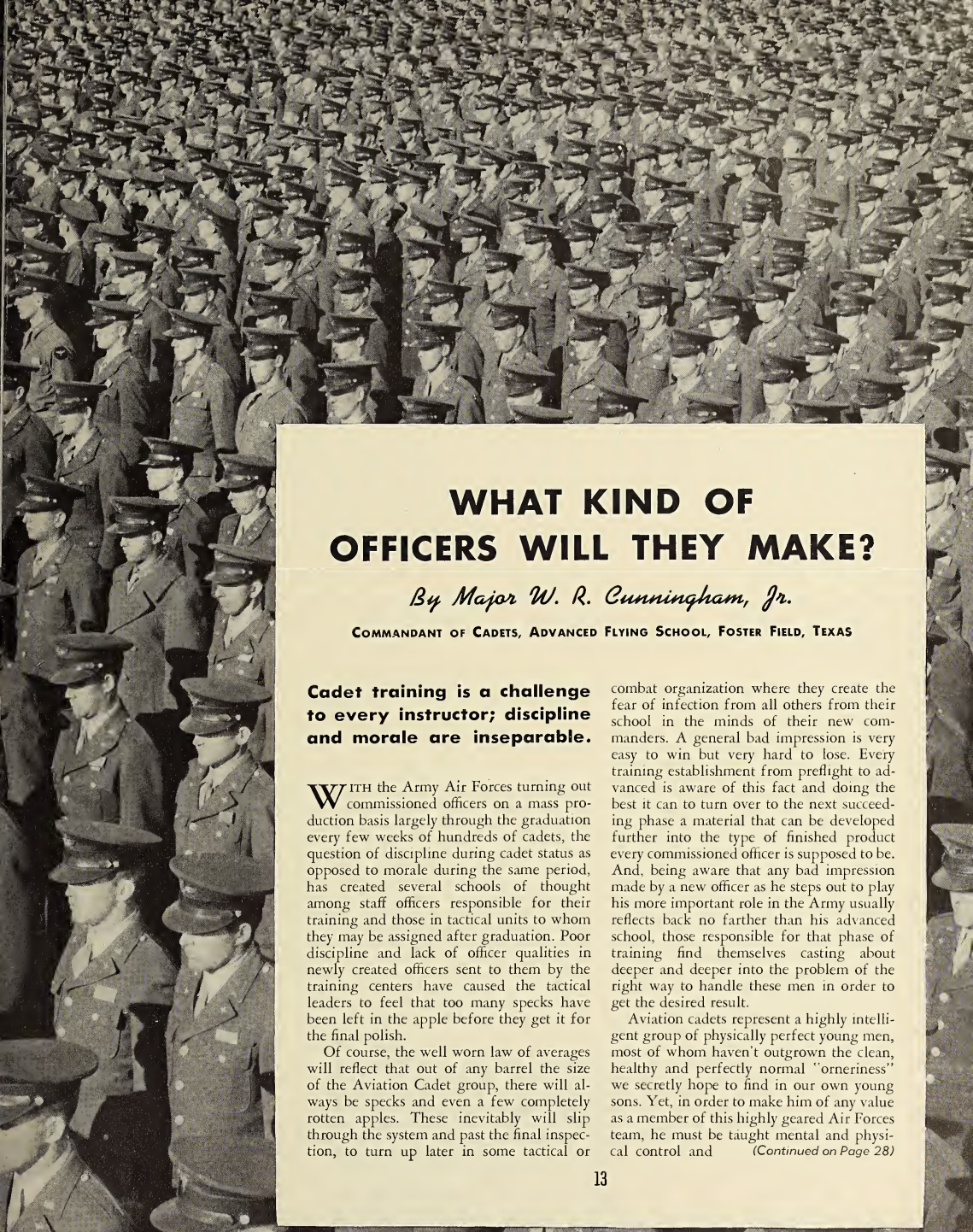


What happens under the new set-up is merely this: At each Airways Traffic Control center an officer of the Directorate of Flight Control will set up shop alongside regular A.T.C. men. When a military flight is cleared through his region, he will keep track of it. He will know every time you check in over a range station. He also will have all information available on the weather, and when it looks like trouble ahead, it is his job to let you know what to do about it.

In other words, he will be doing, in most cases, only what you would have done yourself if Adolf, Tojo, and old Benito hadn't made it necessary to talk about dogs and cats when what you really want is weather dope. In the good old days when you not only could ask for weather but could pick it up almost any time while in the air, you decided before you got in trouble whether you should sit down at the nearest open airport, turn around and go home or maybe try an alternate. With weather under a war-time hush-hush, Flight Control officers will do that job for you.

There is a lot of flying that must be done in this country under all kinds of conditions if the pilots we put in combat are going to be able to cope with conditions they are bound to meet. We know that. And the last thing we want is a bunch of namby-pambies flying around in military airplanes. On the other hand, a ship cracked up on this side of combat hasn't done anybody (except the enemy) one little bit of good.

There you have it—this thing called Flight Control. More standardized service at the operations office before you leave and somebody on the ground who wants to see you safely through while you're in the air. That is the guts of this whole program. It's got some teeth, but the basic principle is service to flying personnel—service to an Air Force that has got a tough job that must be done in a hurry. ☆



WHAT KIND OF OFFICERS WILL THEY MAKE?

By Major W. R. Cunningham, Jr.

COMMANDANT OF CADETS, ADVANCED FLYING SCHOOL, FOSTER FIELD, TEXAS

Cadet training is a challenge to every instructor; discipline and morale are inseparable.

With the Army Air Forces turning out commissioned officers on a mass production basis largely through the graduation every few weeks of hundreds of cadets, the question of discipline during cadet status as opposed to morale during the same period, has created several schools of thought among staff officers responsible for their training and those in tactical units to whom they may be assigned after graduation. Poor discipline and lack of officer qualities in newly created officers sent to them by the training centers have caused the tactical leaders to feel that too many specks have been left in the apple before they get it for the final polish.

Of course, the well worn law of averages will reflect that out of any barrel the size of the Aviation Cadet group, there will always be specks and even a few completely rotten apples. These inevitably will slip through the system and past the final inspection, to turn up later in some tactical or combat organization where they create the fear of infection from all others from their school in the minds of their new commanders. A general bad impression is very easy to win but very hard to lose. Every training establishment from preflight to advanced is aware of this fact and doing the best it can to turn over to the next succeeding phase a material that can be developed further into the type of finished product every commissioned officer is supposed to be. And, being aware that any bad impression made by a new officer as he steps out to play his more important role in the Army usually reflects back no farther than his advanced school, those responsible for that phase of training find themselves casting about deeper and deeper into the problem of the right way to handle these men in order to get the desired result.

Aviation cadets represent a highly intelligent group of physically perfect young men, most of whom haven't outgrown the clean, healthy and perfectly normal "orneriness" we secretly hope to find in our own young sons. Yet, in order to make him of any value as a member of this highly geared Air Forces team, he must be taught mental and physical control and *(Continued on Page 28)*

From the front, this haystack blends naturally with the surrounding countryside—

But viewed from the rear, it becomes a hangar for a full-sized dummy of a P-40 fighter.

CAMOUFLAGE IS A MUST!

By LIEUT. GEORGE BRADSHAW

IN combat zones, who should practice camouflage?

The answer to that is straight and simple: Everyone.

Successful concealment in the field becomes possible only when it ceases to be thought of as the business of a few experts, and becomes the personal and daily concern of every member of the Forces—from the front line to base camp.

What is camouflage?

Camouflage is any and every means of hiding or disguising yourself from your enemy; misleading him as to your position, strength and intention; confusing him so that he wastes his blows and falls into your ambush.

How can everyone practice camouflage?

By following the discipline set down by the camouflage officer.

Every human activity, from planting beans to building a railroad, leaves a visible mark on the face of the earth. The marks left by an army are completely different from those left by a civilian population and if that were not so there would be no camouflage problem.

Therefore, the most important camouflage rule which *everyone* can obey is: *Do not make tracks.* Walk and drive within the limits staked off by the officer. It is obvious that if a position, no matter how cleverly concealed, has dozens of tracks leading up to it, the enemy will not long remain confused. A vital point will have one trail leading up to it and then going on to a logical junction, another road or a house or a settlement. The man in the air, of course, is our chief enemy. The hills and valleys which hide opposing armies from each other at ground level mean nothing to the airman. To him our place and position are laid out as on a platter. For him we must practice mass confusion and concealment. It must always be remembered that no part of a country can easily be made safe from his eyes, his camera and his bombs.

Therefore, if we do not know how we look to an airman, we cannot well go about trying to deceive him. He can see us and the marks we make in all lights and at all angles. His photographs can be studied at leisure and with instruments so exact that a stereoscopic reading of a good pair of vertical photos would betray the presence of artificial overhead cover that can easily cheat the naked eye.

Flat-top camouflage cover makes this P-40 practically invisible from the air.

Suppose the enemy has photographed and detected a camouflaged position. What can he do about it?

Grant that he has a pinpoint map reference and a photograph of the target. Still, with all this information, he must detect his target with his eyes before he can even start preparation for bombing. What does that mean in the case of a ship at 10,000 feet flying at, say 250 miles an hour? It takes seconds from the time he thinks he has identified the target until the moment he is certain he has identified it. It takes more seconds from the moment he is certain of the target until the moment when he has made his calculations, set the course, adjusted his bombsights and pressed the button. And the bomb itself in its travel to earth moves forward a certain distance in hundreds of yards. All this time the ship has been going at 250 miles an hour. Therefore, to be sure of unloading his bombs on or near his target, the airman must correctly identify the target while he is somewhere between 3½ to 5 miles away from it.

There has never been any contention that camouflage will in any way avoid attack on a position where objectives are known to exist by the enemy. But in such a case it does lessen the chance of precision bombing and, as a result, may assist in keeping an important work in action.

There is also this to remember: A well-camouflaged position is less likely to be photographed in the first place. Air observers, being human, are unable to concentrate keenly for long periods of time. In

general, they see those things which are easy to see and miss those which require an effort. Thus the most conspicuous things are those most often spotted by reconnaissance aircraft and consequently are the most photographed.

It is to be concluded, therefore, that weapons which camouflage must fight are the eye of the observer and the lens of the camera.

Camouflage should blend as nearly as possible with the colors of the surrounding position. However, it has been established —and there can be no question of this conclusion—that an observer at some thousands of feet is aware of an object by its lightness or darkness and not by its color.

It is of value, therefore, to know what makes objects light or dark. Color, of course, is partly responsible. Other things being equal, the brown loam of a freshly plowed field will look and photograph darker than the pale green of young sprouts. But if you take two surfaces of the same color, the factor which determines how light or how dark they look is their texture. Texture is the degree of smoothness or roughness of a surface and its consequent ability to cast a shadow on itself or its surroundings.

Take a surface that is perfectly smooth of any given color, say, green. The rays of light which strike it are bounced off in parallel rays, like tennis balls from a concrete court. A high proportion of those rays enters the eye of our camera and an effect of lightness is produced.

Take another surface of exactly the same color, lighted in exactly the same way. Only this time it is an uneven, corrugated surface. The rays are bounced off at all angles, like tennis balls from a sheet of corrugated iron. A lower proportion of rays reaches the eye or lens and an effect of relative darkness is produced.

TAKE a third surface of the same color, lighted the same. This time the surface is a nap or texture, like grass or strands of burlap, each strand capable of throwing a shadow. Looking straight down, the airman sees all the shadows, whereas the man on the ground may not. The surface may look light at ground level but to the airman the napped or textured surface produces an effect of relatively great darkness.

Water is an exception to this rule. For a variety of reasons, depending upon local conditions, water may look and photograph blinding white or inky black.

This fact, too, should constantly be kept in mind: Seen from the air in full sunshine a natural shadow is almost invariably the darkest thing on earth. In addition, it is a good working rule to accept that, whereas black paint will often look and photograph surprisingly light in tone, a real shadow always looks almost black.

All AAF personnel should know and practice the art of concealment to baffle the enemy.

A clear understanding of the importance of texture is indispensable to successful concealment in the field.

At March Field, California, the Army Air Forces now has in operation a school (formerly at Hamilton Field) which concentrates primarily on the problems which face the advanced units of the Air Forces. Hundreds of officers have already been graduated and other hundreds are now in training. These men are being assigned with combat units as camouflage officers; they will impress the personnel with whom they come in contact with the need and desirability of total cooperation in camouflage.

(Continued on next page)

Camouflage For The Army Air Forces

By Brigadier General S. C. Godfrey, U. S. A., Air Engineer

THE Army Air Forces is becoming increasingly camouflage-conscious.

In our peacetime training and maneuvers, such things as dispersion, concealment and camouflage receive too little attention. They involve trouble and inconvenience, take time, require materials and add to the cost. It is much like digging trenches. Our Army doesn't do much trench digging in peacetime maneuvers but in war men dig in, and dig in furiously, rather than be killed.

So on the battlefield we sometimes learn—the hard way—that planes and facilities on an airdrome must be dispersed to minimize costly losses; that concealment is a most potent means of protection; that even an elementary knowledge of camouflage may save lives; that all these procedures are not merely defensive measures but have to do with deceiving the enemy and adding to our offensive power. It is well if we can learn these things before going into battle.

Camouflage is everybody's job. The Corps of Engineers is charged with the development of camouflage technique, the preparation of camouflage literature, the procurement of camouflage supplies, and assistance in training and practice of camouflage. Engineers in all echelons can assist with their technical knowledge and can do a certain amount of actual construction—but the practice of camouflage and camouflage discipline is the task of each unit, not just a specialist's job. The success in implementing a program of training and use must depend upon the interest of commanding officers and their vigorous action to assure attention to this subject.

There are many evidences of growing interest and proficiency in camouflage in the Army Air Forces. Our Camouflage School at March Field (which is integrated with the Camouflage School at Fort Belvoir, under the Chief of Engineers) has now graduated hundreds of Army Air Forces officers of all ranks who have learned something of sound technique during two weeks of intensive courses. In each Air Force mobile school units have been organized to carry instructions to non-commissioned officers at home stations. Camouflage instruction is being included in most of the training activities of the Army Air Forces, including operational training. The Fighter Command School, at Orlando, has given it much attention, and full provision is being made for it in the plans for the Army Air Forces School of Applied Tactics. Air Service groups, with engineer assistance, have operated this past year from camouflaged bivouacs. Dummy airfields and dummy towns are in the picture. We now have two well-trained camouflage battalions, prepared to contribute to effective training at home or to serve overseas.

Some of these recent camouflage training activities are well described and pictured in Aviation Engineer Notes No. 10, prepared and published by this office in the Directorate of Base Services, and distributed to all Army Air Forces activities. These present a detailed picture and reflect the spirit, enthusiasm and effectiveness of some of these training activities.

Still more valuable will be the presentation, from time to time, of pictures of camouflage activities overseas. These come, as a rule, in fragmentary form, with here and there a striking example of how the skillful use of some local materials has aided effectively in concealment. An Engineer soldier who had helped to camouflage some anti-aircraft batteries in Hawaii was wounded and returned to the United States after December 7, 1941. It was his proud remark that "they hit our dummy guns, but they didn't hit the real ones!"

It is not my purpose to write here a technical article on camouflage. But I am interested that one of the staff of AIR FORCE, after visiting our Camouflage School, has prepared an article on camouflage and its importance as it appears to him. It is a good basic treatment of the subject, and should be of interest to many readers.

CAMOUFLAGE IS A MUST!

(Continued from Preceding Page)

On the east coast a similar course is given by the Chief of Engineers at Fort Belvoir, Virginia, for officers of both Air and Ground Forces.

The basic purpose of the instruction at Hamilton Field is to teach the men to use that uncommon attribute—common sense.

The course naturally includes all the fundamentals of camouflage, materials, organization, interpretation, requirements and so on. They are immediately indoctrinated with a principle which might well be applied to all branches: If a camouflage idea prevents the effective tactical use of a weapon or position, modify the camouflage idea. If an effective camouflage idea interferes with the administrational layout, change the administrational layout.

These men are put to work garnishing fish nets, the weaving of mats and screens. They are taught the operation of paint shops and the use of scrim, the draping of nets, the use of adhesives. They are taught the facts of dispersion, the uses to which everything from chicken feathers to local grasses can be put. The principal emphasis always is placed on how to use quickly and effectively the materials at hand.

Also—and this is certainly as important as anything else—they are shown the necessity of camouflage discipline.

As said before—and it cannot be too strongly emphasized—no matter how well concealed an object may be, its position will be instantly apparent if there are tracks and paths leading up to it and packed down areas around it. Thus, one of the most important functions for the camouflage officer is to see that the approaches to his objective do not have an extraordinary appearance. He must see that no impedimenta is ever out from cover or shadow. Standing grass, as pointed out, looks dark to the airman because he sees the shadow cast by each blade. When some of those blades of grass are laid flat by the feet of men or by rolling wheels or any other cause they cease to throw shadows and become smooth reflecting surfaces facing the sky. Therefore, they look and photograph light. Few people realize with what certainty this effect is produced. They think that one or two journeys across the grass on foot or with a truck cannot make all that difference.

It cannot be over-emphasized that the one camouflage effect to which everyone from cook to pilot must contribute is discipline.

Finally, of course, the object of the school is to indoctrinate Air Force personnel with the constant necessity of camouflage, to make clear that concealment is not hiding for hiding's sake. It is hiding in order to attack the enemy with more deadly effect.

Camouflage is just as surely an offensive operation as it is a defensive. There is no attack without materiel. ☆

Camouflage DO'S and DONT'S

DO choose your position carefully. A proper "estimate of the situation" will make your work easier and avoid impossible camouflage problems.

DO avoid the skyline when concealing against observation from the ground.

DO make full use of natural cover. Utilize ditches, hedges, edges of woods, folds in the ground, etc.

DO avoid conspicuous landmarks. You don't want to be at a focal point of enemy attention.

DO keep in the shadow. The enemy can't see or take pictures in the shade.

DO remember that shadows move. Although shadows as a rule fall toward the North, their length and direction change throughout the day.

DO avoid regularities of line or spacing. Nature has no straight lines and the enemy is looking for unnatural signs.

DO garnish carefully. Natural garnishing must look NATURAL, so use material similar to that in the vicinity and support it as it would grow.

DO thin out garnishing at the edges. A regularly garnished net casts a regular shadow which is obviously out of place in the surroundings.

DO change dead vegetation. Forget and something (or somebody) will be dead.

DO keep turf or topsoil when digging in; use it to cover your spoil on the parapet.

DO make Bold pattern, in garnishing or painting. You can't see a two foot "break" in the outline from a distance of a mile.

DO "look before you leap." Plan and lay out your position in detail before moving in and trampling down promiscuously.

DO observe camouflage discipline in making a reconnaissance. Signs of activity before occupation are just as disastrous as signs afterward.

DO restrict movement when the enemy is observing. A moving object may attract attention.

DO take extra care when tired. Fatigue leads to carelessness.

DO work in the shade or at night. The enemy is looking for you at all times but his eyes are not as good as a cat. He can't hit what he can't see.

DO keep your flat tops "Flat." Sagging nets are worse than baggy knees.

DO use existing roads. Traffic here will not leave noticeable signs.

DON'T be careless and give away your buddies. They're depending on you just as you are on them.

DON'T look up at airplanes. The enemy is looking for you too and you're easier to hit than he is.

DON'T move unless you have to; then think first how you can move to cover most unobtrusively.

DON'T use artificial materials unless the natural cover is insufficient. Natural cover blends best with Nature.

DON'T be regular in your layout. Regularity is a military attribute and the enemy recognizes it as such.

DON'T take shortcuts over the open or step outside cover. Every time you put your foot down you attract forty-eight square inches of enemy attention.

DON'T walk around the outside of a net to fix the camouflage. Where you walk will be light in a photograph; the camouflage will be dark.

DON'T hide your installation and leave your spoil and belongings in the open. Remember the Ostrich.

DON'T let your flat tops sag. They will photograph like a wet blanket laid out on brushes and they are not a bit safer.

DON'T lower the sides of your camouflage. Your Commanding Officer cannot see what you are doing, but when the enemy sees the shadow thrown by those sides he will be even more severe.

DON'T hide under matted camouflage. It is as conspicuous as a bad haircut.

DON'T end a road at an installation or make a lot of trails to a position. Have you ever lost your way to a Canteen?

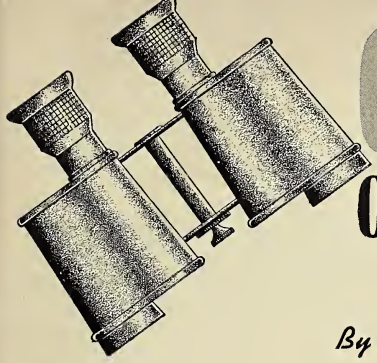
DON'T leave things near the edge of your camouflage. The edge of your camouflage isn't—and shouldn't be—opaque.

DON'T put up bad camouflage and think it's a magic veil. There aren't any in war.

DON'T crowd around an installation. Dispersion reduces the likelihood of conspicuous trampling.

DON'T clean up old position; it won't look natural to the enemy. If you're moving out, it will remain as a dummy; if you're moving in you don't want to change the appearance.

DON'T expose lights or make a great deal of smoke. The enemy is looking for such beacons.



Observations ON THE RUSSIAN FRONT

By Major John C. Henry
AIR TRANSPORT COMMAND

A description of the Soviet offensive by a member of the first group of foreign observers to witness combat operations in Russia.

THREE American Army officers have been the first foreign observers to witness actual combat operations of the Soviet Army.

The group, headed by Brigadier General Patrick Hurley, former Secretary of War, visited the desperately contested Don-Stalingrad front early in December, traveling close behind a fast-moving Red Army as it sliced its way southward. Later, the same official group went into the Caucasus to another sector of this gigantic winter offensive operation.

Lieutenant Colonel Richard Park, Jr., assistant U. S. Military Attache at Moscow, was the second member of the American party. I was the third. General Hurley, visiting Moscow on a special assignment for President Roosevelt, arranged the trip to the fronts during a conference with Premier Stalin at the Kremlin.

For the actual entry into Soviet air, the Russian government added to our American crew a navigator and radio operator from their own Air Corps—essential assistance for the jump over the rugged Elburz Mountains and across the Caspian into territory where foreign planes without certain identification are shot down first and questions asked second.

And when it came time for us to leave Moscow for the journey into combat areas, we transferred into a Russian-built plane piloted by a 27-year-old Captain wearing two Red Army decorations for bomber and parachute service earlier in the war. Around us throughout our travels in the combat zones were fighter escorts, usually eight in number, and our altitude seldom exceeded 300 feet. More often it was 100 feet as we hedge-hopped over houses, hay-stacks and great forests of white birches that break the snow-covered steppes.

Neither section of our trip up to the fighting lines was a sight-seeing expedition; they were military reconnaissances in which every pertinent fact was laid out by the commanding generals of a great offensive operation for the critical scrutiny of the officers of an allied army. The cooperation in this respect could not have been more complete if we had been observers with our own forces.

The campaign which we reviewed in the Stalingrad sector was painstakingly planned. Tactics which had worked well for the enemy were reviewed and transposed with modifications or improvements into the Soviet battle plan. Great dumps of supplies were established at the safest convenient points.

Every facility for transport of the day to day needs of an attacking army was pressed into service — aircraft, railroads, motor trucks, oxcarts and even sleighs. Manpower was assembled in generous quantities and the responsibility for leadership and execution placed in the hands of young officers whose knowledge of war had been gained in the field since June 1941.

For obvious reasons much that we saw and heard in this campaign must not be told publicly at this time. On the other hand, previous Soviet policy of permitting no foreign observers, either Allied or Neutral, has created great mystery around actual front line operations of the Red Army. The lifting of this veil in the case of the Don-Stalingrad offensive was a substantial gesture toward more complete American-Soviet cooperation and coordination of effort.

Briefly, the Soviet battle plan called for the drive of a spearhead army due southward from Serafimovich on the bank of the Don with a pivot at Kletzkaya and further advance southeastward to another crossing of the winding river. In the vicinity of the railroad line between Stalingrad and Kalach, junction was to be effected with two armies that had started westward from just south of Stalingrad and wheeled in a northerly direction for the closing of the pincers.

Protecting the spearhead army from the north was another army on its west flank, employing the River Chir as its front against the Axis forces, and still another army on the east flank with the task of cleaning out all enemy forces within the Don elbow between Kletzkaya and Peskovatka.

Almost to the mile and to the minute this program was carried out. Although preliminary operations early in November had established the spearhead army at a good starting point between Serafimovich and Kletzkaya, the real push took place in a crowded four days late in the month.

When this 96-hour span was completed the toughest fighting division of the spearhead army had joined hands almost due west of Stalingrad with units from the two southern armies, the clean-up job inside the Don elbow had been done with merciless efficiency, the western flank seemed securely covered at the Chir, and roughly a score of enemy divisions were encircled between the Don and Volga Rivers.

Because of unfavorable flying weather, air strength had played a very small part in this offensive operation and we saw relatively little air action during our travels on either front.

It was emphasized, however, that Soviet air reconnaissance had done a magnificent job in supplying photographs and detailed information on enemy positions to the Red ground troops. At Kletzkaya, we were told that the Russian artillery knew the position of every Axis gun on the Don river heights and that the benefits of this knowledge were evident in the quick rout of the enemy batteries.

Conversely, the Soviet commanders told us that the surprise element had been complete in the preparation and launching of their offensive—largely because their fighters had driven off virtually every Axis reconnaissance plane before it could complete its mission. We saw numerous instances of this alertness by the Red fliers as they patrolled the skies over the combat sector.

Apparently outnumbered and aware of it, the Axis air force showed itself hardly at all except for somewhat desperate attempts to move supplies across the Russian ring into the area held by the encircled axis divisions. Several times we saw flights of Junkers transports (Continued on Page 37)

ON THE LINE

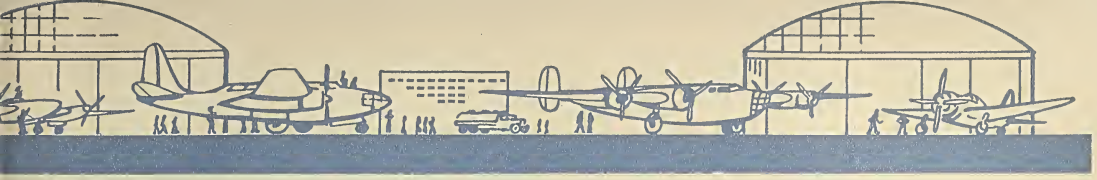
WHAT'S WRONG WITH THIS PICTURE?

Well, several things; eight to be exact. Or did we miss something?

Tech Sergeant Fred Kohlman and Sergeant Clarence Shwake suggested the boners pictured above. Staff Sergeant Francis Seitz posed *how not to do it*. All three are in Headquarters Squadron, Air Service Command, Patterson Field, Ohio.

"Our Mechs in the Army Air Forces are the best in the world," says Crew Chief Seitz, "but a few of the boys sometimes forget what they're taught—or are so busy they just get careless. You can spot the careless ones by their work and their results. Just watch!"

We did. What's wrong? Answers are on the opposite page.



A monthly roundup and exchange of hints and tips for mechs—some old, some new—in the interest of better maintenance.

Did You Know . . .

That Technical Orders should always be made easily available to the men of the air and ground crews whose duties require constant use and reference to them. See T. O. No. 00-25-3.

That the word RESTRICTED on Technical Orders does not restrict men on the line from reading and studying them daily. Rather, it means that because of the material contained, Technical Orders come under the classification of Restricted documents as defined in AR 380-5, and are for official use only. Use your T. O.s—but don't talk about them to unauthorized persons.

That the maintenance Inspection Record, Form 41B, is now provided with a pocket in which AAF Forms 60A, 60B and 61 will be carried. See T. O. 00-20A, Sect. 1, Para. *d*.

Thanks to Technical Sergeant E. R. Morris of Mitchel Field, New York, who sent in the following reminders:

Tagging . . .

When disassembling airplane assemblies, engines or accessories, it's a good idea to tag each part when you take it off. This makes immediate identification easy and speeds up the job when replacing the parts.

Carburetors . . .

When removing carburetors, be sure to close the butterflies. Safetying them shut before removing the bolts prevents dropping nuts, bolts, washers and bits of safety wire into the blower.

Drip Pan Racks . . .

Vigilant care in keeping drip pans under airplanes while work is being performed, prevents grease and oil from getting on the hangar floor; it makes your job much easier in keeping the hangar clean and safe. One squadron has built a drip pan rack (on the principle of a bicycle stand rack) which holds the pan vertically on their sides. Pans are put on the rack immediately after use. This allows the grease and oil to drain down into another pan (which is placed horizontally under the rack) and assures a supply of clean pans at all times. Also, it is easier to withdraw pans from this rack than to bend over and take them from a flat floor stack. The stand, which provides a separate slot for each pan, protects the edges and prevents them from getting bent out of shape.

Loose Tools . . .

A fighter pilot while recently doing a slow roll at 20,000 feet suddenly felt a sharp blow on his shin bone. Looking up, or rather down, for he was now upside down, he saw a large wrench sliding around the cockpit enclosure. The roll was completed — but cautiously — to keep the ominous wrench from hitting him again. Moral: Don't leave wrenches in the cockpit. Carrying your tools in a kit, rather than stuffing them in your pocket will make it easier to check them when each job is finished.

Multiplication . . .

About last month's item on not brush painting propellers, an engineering officer points out that an ounce of material on the tip of a propeller blade having a five foot radius ceases to weigh one ounce when centrifugal force is applied. At 1800 R.P.M.'s that ounce is multiplied by 5,536—making it 346 pounds to be exact. That's the reason for excessive engine vibration when paint is dabbed on promiscuously. See T. O. 07-1-1 for complete details on painting of propellers.

Use A Pencil . . .

When marking bolt or stud heads, be sure to use a pencil rather than a file. The heads are finished with cadmium plate; a file scratch will open this protective covering and invite rust.

Cotton Plugs . . .

The problem of noise is treated lightly by most members of air crews. Too bad. Exhaustive experiments prove that persons continually subjected to noises of considerable intensity show a slow but steady loss in hearing ability. This leads, in certain cases, to deafness. Ground crew members who are daily in contact with the noise of motors show the same detrimental changes. Flight surgeons recommend the judicious use of cotton ear plugs.

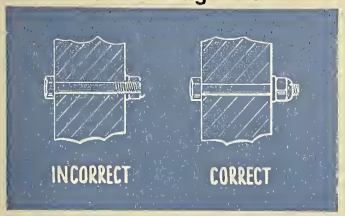
Mistakes on Opposite Page

Reading from left to right

1. Wait a minute! You're likely to damage the trailing edge with the service hose; wing tanks should be serviced from the leading edge of the wing. And it's much easier to get the gas truck in front of the airplane. If de-icer boot is attached, protect it from the hose with sufficient padding. Reference: Common sense.
2. The tank is full, too full. Cut off the gas. You're creating another fire hazard. Reference: T.O. 06-5-1 and common sense.
3. And what's that static ground wire doing hanging loose? Quick, ground the hose! Reference: T.O. 06-5-1.
4. You should be holding the hose nozzle with your hand. Never let it hang there by itself; it may break off the filler neck on the tank. This bad practice, on tanks that have no filler necks, will result in damage to the tanks. Reference: T.O. 06-5-1.
5. Hey! No wonder you're having so much trouble; do one job at a time.
6. Get your left foot off the air scoop. Besides damaging the scoop, you're likely to fall off the wing and hurt yourself.
7. Better not use that screw driver to check the oil level. You're liable to drop it into the tank. Use the oil gauge prescribed for the aircraft you're servicing.
8. Why not use the proper crew chief stand instead of a ladder? And the ladder shouldn't be leaned against the leading edge without proper padding. How do we know it isn't padded? Because you've got it upside down. It's not only wrong — but definitely unsafe.

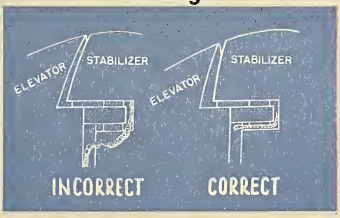
That's what Crew Chief Seitz meant about carelessness.

Self-Locking Nuts



INCORRECT: Bolt not completely through self-locking nut.
CORRECT: One to two threads should be showing beyond the nut for proper installation. See T.O. 04-1-13 for general instructions on use of self-locking nuts.

Bonding



INCORRECT: Excessive length will cause flexing, chafing and eventual breaking of the bond.
CORRECT: The bond is of sufficient length to allow full travel of the surface, and the ends are tinned. Broken and frayed bonding must be replaced as specified in T.O. No. 08-5-1.

Using Cardboard in Combat First Aid

By Sergeant Max Baird

March Field, California

The side of a packing box assumes a place of importance in a novel method of handling wounded personnel.

In Alaska not so long ago, a wounded man from a Liberator crew was carried into an Army hospital with a serious back injury—one of the most dangerous injuries of them all when the patient must be carried.

What kept this incident from being run of the mill was that the man was all trussed up in cardboard marked with strange diagrams and lines reading "Cut here for neck and back splint," "Out here for elbow splint," and similar hand-lettered inscriptions. The cardboard itself, however, still showed the origin of its former duty as the side of a packing box. The wounded man arrived in excellent condition, and the doctors gathered round with lifted eyebrows at this unorthodox, but plainly effective, procedure.

For the answer to that startling entrance into the Alaskan hospital we must hop southward some 3,000 miles to March Field, California.

Using a piece of common ordinary cardboard and a triangular cloth, Major Walter J. Crawford, Medical Corps, after more than a year of research and experimentation at March Field has perfected a revolutionary first aid technique which he has found to be the practical answer in battle.

From a section of corrugated cardboard only sixteen inches wide and thirty-two inches long and following the Crawford diagrams, even Joe Yardbird can quickly bind up an excellent elbow, ankle, leg, neck or back splint that will do the job. Coupled with the use of a cravat (No, Joe, not a necktie, just a medical lingo for a triangular cloth 51 inches at the base and 36 inches on each of the other two sides), these two easily provided articles form the basic ingredients for his recipe for a first aid kit that is capable of pressure-bandaging and splinting most injuries.

Major Crawford follows the old adage that one picture is worth ten thousand words. Also, somewhat like the character who operated the shell game at the county fair, he leaves nothing to chance and, like Gypsy Rose Lee, very little to the imagination.

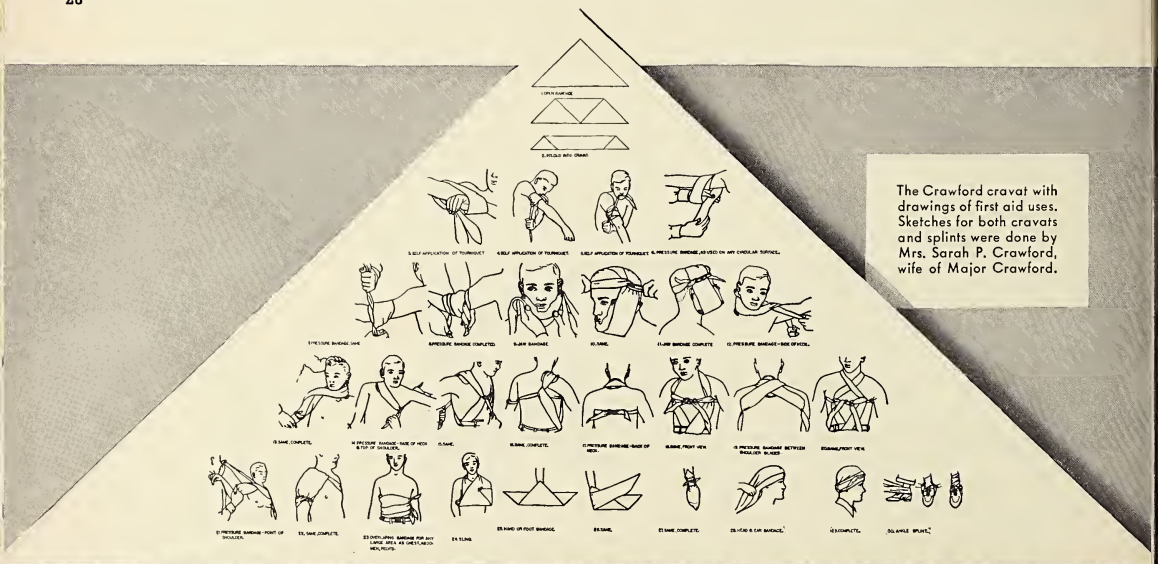
Accordingly, every one of the heavy bombers in his Group takes off equipped with his additions to the standard aeronautical medical kit. These consist of five of his specially designed cardboard splints, three cravats, a tube of Butyn and Metaphen Jelly (for eye injuries and burns), four large safety pins, two poles eight feet long which are used to improvise a litter with flying jackets and one being utilized for the carry through the bomb bay, and, finally, two blankets.

The Crawford cardboard splint is diagrammed with lines and printed directions indicating where to cut to make the required splint for the specific injury. It's as easy as "cutting on the dotted line" to open a box of breakfast cereal. On the lower half of the cardboard are drawings describing how to apply the different splints.

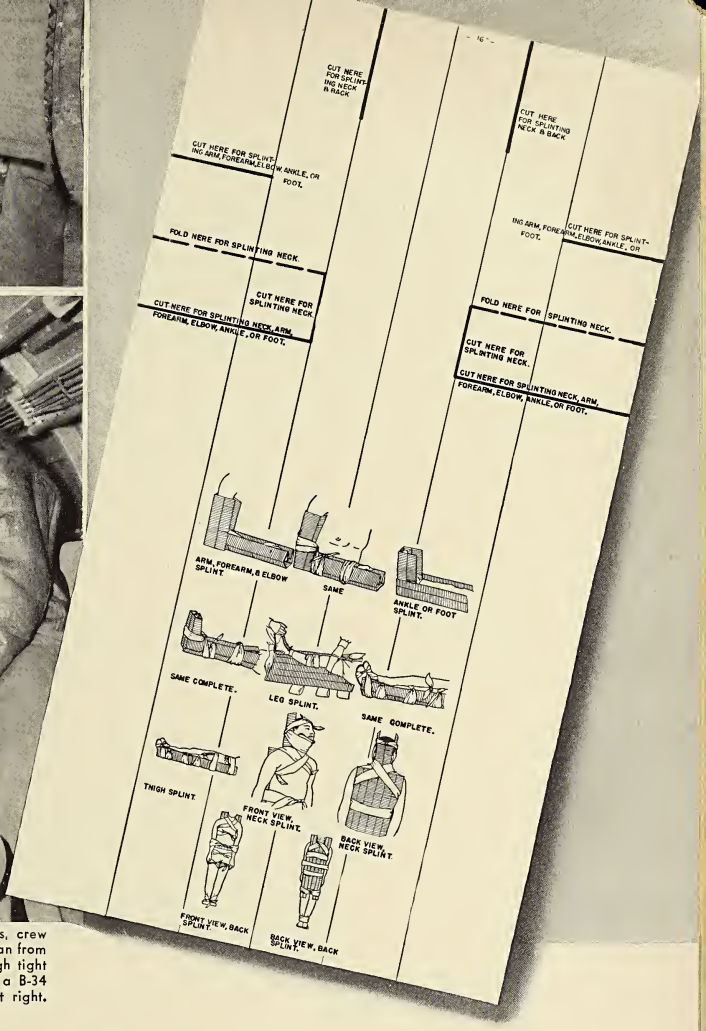
"This splint allows for splinting the elbow and forearm with a folded cardboard layer that provides diffuse, even pressure on the forearm while in a neutral position. The same cuts are made on the cardboard to make the ankle splint," Major Crawford says.

The cravat is also stamped with "profuse illustrations" showing how to use it for self-application of a tourniquet, its use for pressure bandages, and a self-operated pressure bandage for the side of the neck, by which the patient can increase or relax the pressure by lowering or raising his arm. The cravat can be laundered and reused.

On the back of the cardboard are detailed first aid instructions for shock, wounds and hemorrhages, fractures, burns, artificial respiration, and transportation of wounded. Listed also are the contents of the standard aeronautical medical kit and the additional articles carried under the Crawford system, plus the uses for each so that whoever is



The Crawford cravat with drawings of first aid uses. Sketches for both cravats and splints were done by Mrs. Sarah P. Crawford, wife of Major Crawford.



Employing the Crawford cardboard splints and cloth cravats, crew members in the upper photo simulate removal of a wounded man from the bomb bay of a B-24. This method permits passage through tight squeezes such as the entrance to the pilot's compartment of a B-34 (lower photo). Front view of one of the splints is shown at right.

applying the first aid can determine at a glance just what he has to work with and what to do with each item. The splints can be (and have been for actual injuries) applied in two or three minutes in contrast to the fifteen or twenty minutes often consumed in using standard splints.

Major Crawford has had remarkable success with the system. "Enlisted men without previous experience have learned to apply all the procedures, pressure-bandages and splints in two hours," he declares.

Since all combat crew members fall within certain sizes he has found that the 16" x 32" dimensions for the cardboard splint "fits" his personnel. For units with men with a wider scale of physical proportions the splint, of course, can be made in correspondingly smaller or larger sizes.

His splints are applied with the clothes left on the patient. Flying at high altitudes wounded men can not be undressed because of the cold. To permit access to the wounded area for bandaging without undressing the patient slits are cut in the flying clothes wherever necessary. In the case of burns he directs that the clothing also be left on because to rip the clothing from a burned area often tears away flesh and accentuates the danger.

Wounded men are removed from the bomber in a manner similar to the pole-carry of two hunters with a dead deer. The cardboard splints, two layers thick if necessary, are used to pad the man's body which is tied with cravats to the eight-foot poles for the carry through the bomb bay. This technique was developed by another flight surgeon, Colonel Clyde L. Brothers, surgeon of the Fourth Air Force, under whose supervision the entire system was worked out.

While most of his technique is original, Major Crawford naturally has called upon previous first aid systems to some extent. The most important contribution was supplied by Dr. Charles F. Sebastian of the Los Angeles Emergency Hospital.

The pressure-bandages which use cross pulls for vertical leverage and the neck and back splints shown are exactly as developed by Dr. Sebastian. The practice of putting a strip of gauze in the head of each safety pin so it can be found and removed quickly with a sharp jerk on the gauze, even in the dark, was also borrowed from Dr. Sebastian who modified it from a trick of British ambulance drivers. Major Crawford added the stunt of having a strip of green gauze to indicate morphine has been administered and red gauze to signify a tourniquet. ☆

Balancing the airman's gripe as a means of overcoming a serious problem in front line flying operations.

A New Aspect of FLYER FATIGUE

By Lieut. Col. David B. Dill

AERO-MEDICAL LABORATORY, WRIGHT FIELD

REPORTS coming from theaters of war have led to a revision of ideas about flyer fatigue. Anoxia has been mistakenly branded the bugbear of pilots as a major cause of pilot fatigue.

This idea now appears to have been an over-simplification that has resulted in much wasted effort in research on "ceiling" and the influences on it of drugs and hormones. Pilots are instructed to use oxygen above 10,000 feet: If they fail to do so and become fatigued because of chronic anoxia the remedy lies, not in pills, but in more thorough education and more comfortable oxygen equipment.

Acute anoxia is a serious problem and will remain so, even if perfect oxygen equipment is developed. In the emergencies of combat, occasional loss of oxygen supply at high altitude is inevitable. Here, too, there are better remedies than pills — improvement in both regular and emergency oxygen equipment and thorough drill in the use of such equipment.

It is now clear that fatigue as it is seen today in combat flyers is no simple state that can be described in terms of cause and effect. Rather, it is produced by the many unpleasant stimuli about which one is accustomed to gripe. So long as the flyer's gripes are balanced by successful missions, by a conviction that he has a role in winning the war, by good and frequent news from home, and by periods of rest and recreation, all is well. If not, all may be lost regardless of remedial measures.

What are these stimuli responsible for flyer fatigue? Some of them are peculiar to war and to the flyer's role in the war; others are essentially the same as those experienced by the wartime worker at home. Examples of the former class are:

Doubt as to whether the engineers and workers at home have given him the best equipment brains and brawn can produce.

Doubt as to whether the mission assigned him has a reasonable chance of success.

Will his gas supply carry him through?

Can he survive a crash landing at sea?

Even if he survives the crash landing, will he be rescued?

Has he and has each crew member done everything humanly possible to make the mission a success?

Will there be impartial recognition of his exploits? Or, will quitters be sent back to safe jobs and to superior ratings?

Some sources of irritation are as common among industrial workers as they are among flyers. Noise, vibration and glare may be as wearing in a factory as in an airplane. However, no job in industry can compare with that of the side or tail gunner in our heavy bombardment aircraft. It is doubtful if there is a tougher job in this man's army than that of the soldier manning a machine gun in a —40 air blast at the open port of a B-17 as the plane is being "horsed around" in evasive tactics at altitudes of 30,000 feet and above.

Relations with one's immediate associates and with superiors in rank may be a source of satisfaction and of inspiration or of discontent and discouragement, whether in industry or in a combat squadron. Strong bonds become established between officers and men who have spent hundreds of hours in successful combat and in long-range flights far above land and sea. Such bonds help to carry men through periods of stress where training, self-sacrifice and team work are at a premium.

HOME conditions may add to or subtract from morale, whether the son is in a distant wartime factory or in far-off New Guinea. Dirt and disease may afflict not only the soldier but also the wartime worker far removed from home comforts. In fact, the soldier may well have better medical care than the civilian.

If irritants are too numerous and too distressing, fatigue results. The flyer does not rest well at night; his sleep is fitful and broken with nightmares. He awakens physically worn and mentally depressed. His spirit lags. He may fail in a mission easily accomplished by a fit and spirited flyer.

The wise commanding officer will heed the advice of his flight surgeon and by enforcement of simple principles will delay or even completely forestall the development of fatigue in the officers and men of his command. These principles are:

Provide friendly, encouraging leadership.

Insure impartial distribution of citations.

Provide the most attractive and comfortable quarters that the exigencies of war permit.

Provide the best food obtainable.

Provide medical care that is competent, kindly and sympathetic.

Provide opportunities for rest, for recreation and for sports with rapid evacuation of non-effectives to their homes.

Relieve combat crews after 100 to 125 hours of combat operational flying.

Relieve members of combat crews who show definite indications of approaching the war-weary stage.

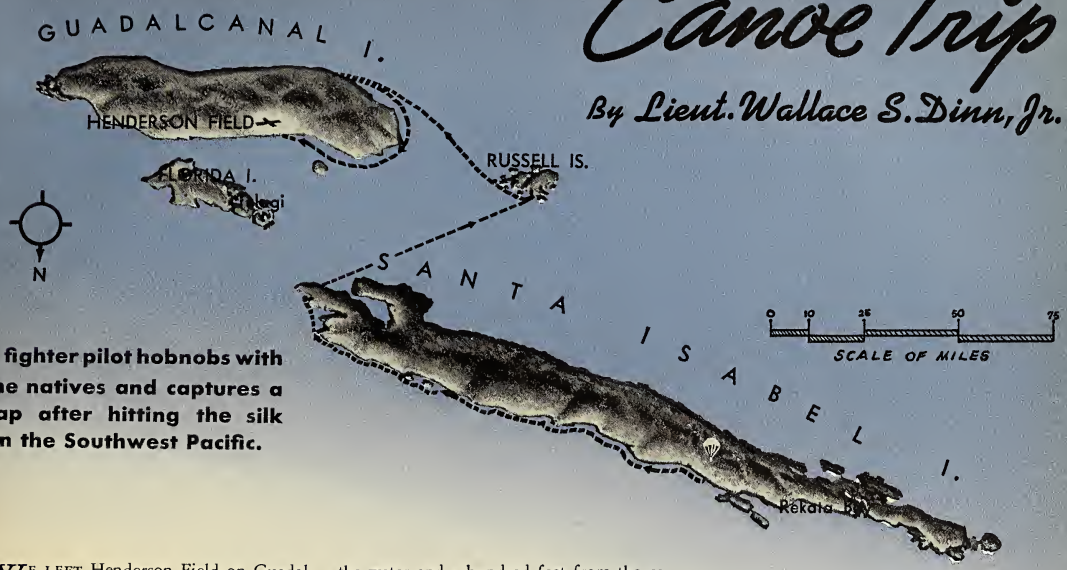
Most of these principles are so well recognized and so generally practiced that no emphasis is necessary. One, however, which has been neglected is the need for providing active participation in sports. Every squadron has an operations officer, an engineering officer and an oxygen officer. There also should be an athletics officer given the responsibility of obtaining sports equipment and facilities for organizing teams and for directing a sports program. Such a program not only would sustain morale but would make flyers more efficient. The man who is tough has the best chance of survival in an emergency, whether in a life raft, in a jungle or on a Greenland ice cap. Such a program of athletics has all the support from higher authority that is needed. This is found in AAF Regulation 50-14, dated August 15, 1942—one paragraph of which Regulation is so clear-cut and emphatic it is quoted here:

> "*7-d-3.* Special emphasis will be placed on a physical training program for conditioning and the maintenance of proper condition of flying officer personnel. All such personnel below the rank of Colonel will participate in a minimum of five hours per week, distributed over a period of not less than three days per week, and when practicable as determined by the commanding officer, this time allotment will be regularly scheduled one hour per day six days per week."

One of the most powerful counter-irritants for offsetting fatigue comes in the form of good news from home. Letters, pictures, magazines, go far towards sustaining the soldier's morale. The full solution for this problem is not in the hands of the commanding officer: He depends on the folks at home to solve it for him by writing often and by sending pictures, home-town news, and newspapers. ☆

MY SOLOMONS Canoe Trip

By Lieut. Wallace S. Dinn, Jr.



A fighter pilot hobnobs with the natives and captures a Jap after hitting the silk in the Southwest Pacific.

WE LEFT Henderson Field on Guadalcanal about seven o'clock on the morning of October 28 to attack the Japanese seaplane base at Rekata Bay, Santa Isabel Island, some 165 miles away. On the mission were four Navy SBDs, six Grummans and three P-39s.

Captain John W. Mitchell was leading Lieutenant Jacobson and me in the P-39s. Our mission was to fly cover for the SBDs, divebomb, strafe and, with the Grummans flown by Marines, cover the return of the SBDs.

There was an overcast ceiling at 2,500 feet, so we made our diving approach above the clouds. The SBDs dropped first and headed back. We dived immediately behind them with the Marine fighters.

After dropping our bombs, we proceeded to strafe the enemy floatplanes on the water and blast a few ground installations. Eight enemy planes were reported destroyed, but I saw only six of them get it. We experienced no enemy fire during several runs.

When we were pulling off the target for home, I spotted an enemy gasoline dump of about 1,500 gallons well-camouflaged on the beach. I called Captain Mitchell's attention to my discovery and he told me to return and strafe the dump if I had any ammunition left. My two right .30 caliber wing guns were still firing so I went down.

The first burst set a small blaze at one end of the dump. I pulled up and started down on the other end. As I dived I strafed the beach and got in an extra burst at the already damaged floatplanes.

I had to fly along sideways to keep the two live guns on the gasoline dump, and as I pulled up this time, I heard a close explosion and my right side went numb. This happened when I was about thirty feet off the water and a hundred feet from the cocoanut trees along the shore. Smoke began filling my cockpit and I saw Prestone running in from the right side. Since I could move my arm without difficulty I figured I wasn't hit badly, if at all.

Immediately I chandelled left, away from the enemy. Smoke was boiling into the cockpit and my breathing was becoming increasingly difficult. The Prestone gauge was against the stop and the oil was heating up like the devil. I tried to call Captain Mitchell on the radio to give him my position because I knew I would have to bail out soon. I couldn't see any of our planes. When I received no answer, I knew my radio set had been disabled.

MY burning ship struggled up to about 2,000 feet and I spotted two Marine fighters in front of me. I fired tracers in front of them to attract attention and immediately they turned. One chap, named Watkins, seeing me smoking, pulled up alongside.

My engine was pounding like hell and giving little power. Since it was low tide and there was a wide expanse of white sand down below, I started to crash-land but thought the better of it when I realized how near I was to the Jap seaplane base. So I figured I'd have a better chance of getting away if I bailed out.

I pulled the emergency door release, waved to Watkins and went over the side. I seemed to fall in a sort of forward position without tumbling. There was no sensation of falling. Probably I was too excited to notice.

Suddenly I realized there was something else I should do—I pulled the ripcord. The ground was now coming up at an alarming rate and I began wondering how I would land. It was all over in a moment. I came down with a bit of a thud in a little clearing at the foot of a tree in which my chute had tangled. I cut my jungle pack free from my chute, cocked my .45 and started down the hillside.

The jungle was so thick I had a tough time making the beach although it was less than a mile away. I decided to visit a village I had seen from the air and began sneaking along the edge of the beach. The Japs were between five and ten miles away, I figured.

I was moving along trying to make as little noise as possible when an old native popped out of the bush ahead, squawked and ran. I followed him as best I could and he led me to a little village of five huts. No one was around.

A native finally came forward, after I had waited anxiously on the edge of the bush for some time, and asked if I were Japanese. I replied: "American," and he came forward, calling out the rest of the villagers.

After I told them I was a birdman, there was nothing too good for me.

One of the young men of the village, named Eric, could speak pidgin English, having attended a settlement mission school for three years. We hit it off in fine style.

It didn't take long to persuade Eric and several other natives to start with me in a small dugout canoe down the coast of Santa Isabel toward Tulagi, some 160 miles away. The first night out we stayed in the village

ILLUSTRATED BY
PAUL REED

of the headman of all the natives on Santa Isabel, a chap named Baku. There was the usual round of shaking hands with the entire population of the village. This I did from a position of importance on something of a throne set up on Baku's front porch.

After a dinner of taro (a Polynesian food plant similar to our elephant's-ear), pineapple and a vegetable that tasted like a yam, the chief — using Eric as an interpreter — asked about the war. In simple words I told the chief and the assembled natives of the United States and England, of Germany and Japan. The natives were greatly interested. In fact, my talk was repeated at least once a day as we continued the journey later and stopped for food at other villages.

BAKU furnished a twenty-foot war canoe and four paddlers, including Eric, and we started out before dawn of the following day. Paddling steadily, we traveled down lovely canals, broad lagoons filled with multi-colored fish and outside the reef into open water. Now and then Japanese reconnaissance planes would fly over and I would duck to the bottom of the canoe. The paddlers would cover me over with matting. This happened several times during the day. The natives would keep me advised whenever we neared a Jap-controlled island.

We were paddling at a rate of about three miles an hour and the first day out we must have stayed on the job for fifteen hours. Since the rainy season had begun we were soaked most of the time.

To pass the time, I taught the boys the tune to "You Are My Sunshine" and they seemed to get a great delight out of humming as I sang the words. (You should hear my voice!) We also sang "Jesus Loves Me," they carrying the lyrics most of the time in their native tongue. "Jesus Loves Me" was their favorite song — you might say, Number One on the Solomons Hit Parade. I learned the natives had been Christianized since 1914.

Several times during the day, we spotted crocodiles lying on logs along the shore and ahead of us in the channel. I fired at several to frighten them away. I had the only firearm in the party, the natives carrying only crude knives and fish spears.

We spent the night of October 29 on the beach and got an early start the next morning. Crocodiles and fish were everywhere. The natives told me two Japs had been in this locale several weeks before but the crocs had eaten them before the natives could assist them back to Rekata Bay.

At noon we spotted more natives on the beach and they told us of a Jap pilot on a little island about fifteen miles away. His Zero had been hit by one of our guns during an attack on Guadalcanal, but he had managed to keep his ship up for about 140 miles before coming down in the water near this island. He now was attempting to get the natives to escort him to Rekata Bay. We decided to capture him.

That night we paddled to another island about half a mile away from the one on which the Jap was located and made plans to go after him the next morning. The Jap's island was very small and there was no cover. The only natives on it were four men, five women and several children.

Since he was reported armed with a pistol, we decided the best way to capture him would be to sneak over the next morning before breakfast and have three of the boys go on ahead just about the time he would be eating, with the other boy and myself following a few minutes later to help out if there should be any trouble.

The three who went ahead were instructed to grab him and his pistol when he placed it on the table to eat. They were successful, and by the time we arrived on the scene about three minutes later, the Jap was in the process of being trussed up. He immediately begged — or rather demanded — that I shoot him. And what's more he seemed to think me a weakling when I refused. He asked me why not and I told him he was going back and dig graves for other Japs killed on Guadalcanal.

We returned to the canoe and headed out again. I tied the Jap's hands with wet rope but didn't tie his feet since it was most uncomfortable in the small canoe.

That night we slept in the rain, if you can call it sleep. The native boys watched our prisoner until midnight and I watched him until dawn.

The next day we pushed on hard trying to make a little better time. And we did despite a heavy rain during the early afternoon. We had the evening meal on the beach before dark since we intended traveling late that night.

During the meal I chatted a bit with the Jap and began to feel a little sorry for him. In fact, gave him my last two cigarettes. He was soon to repay me — but not in kind.

About eight o'clock we began threading our way out through the reef in a driving rain and everyone was busy trying to keep the canoe upright until we reached smoother water—that is, everyone except the Jap. He suddenly tipped us over.

WE lost him as we scrambled for the shore about two hundred feet away. As soon as we made it to the beach, we gathered up our gear and began searching the jungle for our prisoner. After searching in vain for some time, I took one boy and set out for a village nearby, leaving the others to continue the search. They caught the Jap about three o'clock the next afternoon.

I decided right then to weaken him to a point where he wouldn't feel up to repeating his performance. We were faced with a sixty-mile paddle across open water from Santa Isabel Island to Florida Island and Tulagi, and I didn't like the prospect of his turning us over out there. The prisoner was put on a ration of one banana and a little sugar cane a day.

We stayed in the village that night and I learned some Japs were on a little island about two miles away. We became more cautious. The natives, meanwhile, had told me of a coast-watcher with a radio set located some distance down the beach so I decided to take a chance and send a messenger down with a note to be sent to the Marine C. O. at Tulagi. The message read: "Safe here with prisoner. Request orders."

The messenger returned early the next morning (November 2) with the disappointing word that the radio set was out of order, and we made plans to travel across the open sea by canoe. We obtained the largest canoe available, a regular war craft about thirty feet long, with high-pointed bow and stern. I was given nine paddlers for the voyage. The natives figured it would take nearly thirty hours to cover the distance, so we planned to paddle to the tip of Santa Isabel that day, rest for a couple of hours and set out for Florida Island at night when the water would be fairly calm.

We reached the tip of the island by four o'clock in the afternoon and were having a bite to eat when a messenger came running up with word that a British boat was on the other side of the island. He said we could reach the boat — which would take us to Guadalcanal — in about an hour and a half by crossing the 2,000-foot mountain range which constitutes the backbone of Santa Isabel.

I WAS getting very weak by this time and as a result it took us almost three hours to negotiate the distance. Time after time, I had to stop and rest.

The Jap prisoner at first refused to walk at all. One of the boys had an old bayonet which I figured would provide the impetus for our obstinate traveler. The boy jabbed "Tojo" not too gently and the Nip let out a little yip. Just then three large white orchids fell from a tremendous tree under which we were standing at the moment. Mighty incongruous things happen out here.

We finally made it across the ridge and reached the beach, where we were able to obtain a small canoe in which we paddled about five miles along the shore to the British boat. This craft was about thirty feet long and had a top speed of six miles an hour.

We set out about ten o'clock that night for the Russell Islands to land supplies and pick up an SBD pilot and his gunner who had been forced down. We arrived about noon the following day (November 3) and remained until two o'clock the next morning. In the interim, we searched an adjoining island for three Japs the natives reported were stranded there. We failed to find the Japs but we destroyed their clothing and food.

From the Russells we chugged over to the back side of Guadalcanal to pick up another SBD pilot and a Marine fighter pilot. The former had been lost for twenty-eight days.

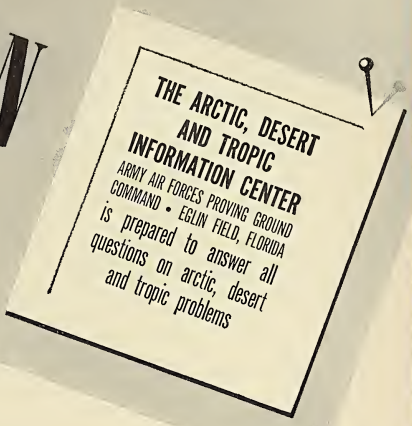
We finally made it back to the base late in the afternoon. I was fed up with water travel. Six days in canoes and two in a small boat made Henderson Field and its aircraft look like heaven to me.

Little the worse for wear, I was back in the air after a day's rest.

By the way, "Tojo" got his job digging graves. ☆

INFORMATION

- if you please!



By Lieut. Col. H. O. Russell

DIRECTOR, ARCTIC, DESERT AND TROPIC INFORMATION CENTER, EGLIN FIELD, FLORIDA

GLOBAL war confronts us with a dual fight. Not only must we overcome the enemy, but we must also conquer the obstacles of climate and terrain and disease, and solve a host of unfamiliar problems in every corner of the earth.

To win wherever we fight—on the ground and in the air of the frigid arctic, the arid desert and the steamy tropics—we must first know what is in store for us. We must know the conditions that exist in every combat zone in which we operate. More than that, we must be prepared to cope with these conditions.

The collection, evaluation, preparation and dissemination of information on all problems arising out of arctic, desert and tropic operations is the job of the Arctic, Desert and Tropic Information Center (ADTIC). Its directive from the Commanding General of the Army Air Forces reads:

"There will be organized and operated by the Commanding General, Air Forces Proving Ground Command, at Eglin Field, Florida, an Information Center for the purpose of collecting, recording, coordinating, and preparing for publication pertinent data bearing upon the specialized operating conditions encountered by the Army Air Forces in conducting operations in arctic, desert and tropic areas."

The ADTIC was created solely to serve the Air Forces, to provide to its various commands information both of a general and specialized nature covering all phases of Air Force activities in arctic, desert and tropic areas. This takes in the operation and maintenance of all Army Air Forces equipment, including such problems as shelter, food, medicine, clothing, and the selection and care of personnel. Special emphasis is placed on studies to develop the best procedures for use in cases of forced landings, and to recommend emergency kits and survival methods for those forced down as well as procedures for secure crews. Other activities include recommendations regarding manning tables and tables of basic allowances and recommendations for appropriate actions based upon research, findings and conclusions.

The ADTIC exists to furnish information requested by the divisions, directorates and commands of the Army Air Forces. It undertakes such special studies as may be directed by the Commanding General of the Army Air Forces. It is concerned with the collection and dissemination of all possible information on air operations under the peculiar conditions of the arctic, desert and tropics. This information is prepared for publication and dissemination to the service in the form of technical manuals, technical orders, training manuals and special studies.

THE reservoir of information available at the ADTIC is constantly supplemented by the activities of a large group of experts, information collectors, researchers, writers and special consultants. Nucleus of the organization are experts on the conditions in each zone. These constitute leading scientists, geographers, explorers and pilots who are authorities in their fields and qualified to evaluate both general and specialized information. They are assisted by a group of information collectors and reporters who gather data from every conceivable source. Information is gathered by various liasion officers from intelligence reports, from returned combat pilots, from the experience of our allies, from interviews with competent observers, and from a variety of publications. Consultants in all specialized fields are available for assistance on a multitude of problems. Leading research libraries and institutions, as well as industrial enterprises with world-wide interests, contribute relevant information drawn from their files.

The ADTIC is constantly working on problems and projects originated within its own organization, with a view toward immediate or future usefulness. But its major function is to supply information on pressing current arctic, desert and tropic problems of the various Air Force units. Such requests are assigned to specialists in the field in which they fall. Under the supervision of the zone head, information is collected or drawn from ADTIC files. It is evaluated and coordinated by competent authorities and then placed in the hands of writers who shape its final form, either as a publication or a special study report.

The effectiveness of the ADTIC is in direct proportion to the use made of its services. It exists for the sole purpose of serving the Army Air Forces. It has the resources and the capacity to furnish information on every phase of Air Force operations, and it solicits the problems of all units which may either be operating or planning operations in arctic, desert, or tropic zones. Information on the aspects and prevention of frost-bite may be required. The ADTIC has the facts. Or you may want to know the problems and best solutions for the maintenance of aircraft under conditions of desert dust and sand. The ADTIC has the facts. Or you may want vital information on the procedure for survival for personnel forced down in the jungles or New Guinea, or on the Libyan Desert, or in the desolute wastes of Alaskan tundra. The ADTIC can and will help.

This, then, is the Arctic, Desert and Tropic Information Center. It has been established, and it works for you in the Army Air Forces—to help you understand what you will be up against in arctic, desert or tropic zones—to help you meet strange and difficult conditions, to help you win out over them, and to do your job safely and well. We urge you to make use of the ADTIC. It is ready and willing to serve you.

What's your AIR FORCE I.Q.?

The puzzle department worked overtime to produce this month's collection of Quiz stumpers—so *en garde!* On the basis of five points for each question correctly answered, a score of 100 puts you at the head of the class; 90 is excellent; 80 good and 70 fair. You'll find the answers on Page 40.

1. As the bomber flies, it is approximately how far from London to Berlin?

a. 570 miles
b. 720 miles
c. 805 miles
d. 430 miles

2. The Fairchild AT-14 has

a. Two radial air-cooled engines
b. One radial air-cooled engine
c. Two inline air-cooled engines
d. Two inline liquid-cooled engines

3. What is a line squall?

a. An argument on the line
b. A slowly moving weather front
c. Heavy storms, particularly in the summer
d. An intense cold front accompanied by storms

4. The proper procedure for an emergency water landing is

a. Gear up and no flaps
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c. Gear up and flaps
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5. Luke Field is located near

a. St. Luke's, Arizona
b. Amarillo, Texas
c. Phoenix, Arizona
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6. What is the equivalent Army rank to a Commander in the Navy?

a. Captain
b. Colonel
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7. The tachometer indicates

a. The temperature of the air around the engine
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8. The plane below is a

a. Wellington
b. Lancaster
c. Liberator
d. Blenheim

9. The Messerschmitt 110 is a

a. Single seat, two engine fighter
b. Single seat, single engine fighter
c. Two seat, two engine fighter
d. Multi-place, four engine bomber

10. The identification letter "F" refers to a

a. Photographic plane
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11. If a man becomes unconscious in flight due to a faulty oxygen supply, the best thing to do is shake him severely in an effort to revive him.

a. True
b. False

12. Casablanca is in Algeria?

a. True
b. False

13. Pyrotechnic signals make use of

a. Smoke columns
b. Floshlights
c. Fireworks
d. Connons

14. Which of these is an adaptation of a slogan popular during the Spanish-American war?

a. "Thumbs Up"
b. "Keep 'em Flying"
c. "Remember Pearl Harbor"
d. "We Do Our Part"

15. Four minutes of time equals

a. One degree of longitude
b. One minute of longitude
c. 15 degrees of longitude
d. 360 degrees of longitude

16. The monthly bonus for paratroopers who do not otherwise receive flight pay is

a. $50 for officers; $25 for enlisted men
b. $50 for both officers and enlisted men
c. $100 for officers; $50 for enlisted men
d. Fifty percent of base pay added

17. The expression "buzz the field" means

a. To fly low over the field
b. To contact the control tower
c. To call the operations office
d. To locate the field on the map

18. The newly adopted popular designation for the B-26 is the

a. Mitchell
b. Liberator
c. Marauder
d. Havoc

19. What is the International Code for "all clear"?

a. QQZ
b. QQW
c. QQQ
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20. This bomb being dropped below weighs

a. 500 pounds
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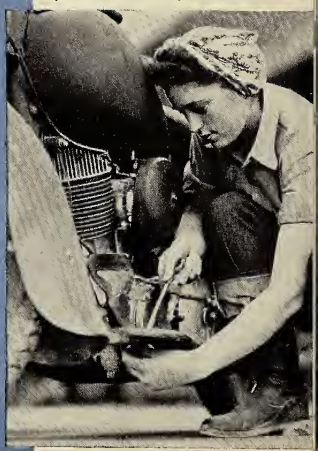
Gloria Jacobs, women's world pistol champion, has laid aside her revolver for the duration and now aims an electric drill at the Axis.

Dixie Hammill (below) has exchanged study of art for the study of motors at McClellan Field, Cal., where she specializes in motorcycle maintenance.



THE Feminine Front

COMING from the school room, home and the department store counter, women are daily releasing scores of men for combat service as they take over an ever increasing assortment of Air Forces jobs. Here some modern members of the "air sex" are shown performing vital tasks that range all the way from strenuous ground crew duties to actually taking ferry planes into the Air Force's own "wild blue yonder".

Geraldine B. Keyes, Alice H. Harris and Janet Walker are going aloft in an army transport to "get the feel" of flying. They are plane dispatchers, and issue flight sheets to transient pilots at the Sacramento Air Depot.

Hauling all types of planes to and from the line is just one of Evelyn Chisum's jobs at McClellan Field. She also stands by with fire extinguisher for emergencies and even removes wheel chocks for take-offs.

The responsibility of packing parachutes is entrusted to Barbara Towne, shown above at the New Castle (Del.) Army Air Base. Barbara is a WAF and holds a pilot's license.

At Duncan Field, Texas, Mrs. Carrie Fuller and Mrs. Kathleen Birchfield carefully hang and air out a parachute before it is turned over to the riggers for packing. Moisture in the parachute might prevent its opening.

Helen Richards is only twenty-one—but she already is a flying veteran with five years piloting experience. Helen, who is attached to the New Castle Air Base, is also the youngest member of the WAFS.

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WHAT KIND OF OFFICERS?

(Continued from Page 13)

co-ordination of all these normal thoughts, inclinations and acts. This is necessary in order that a high and dependable degree of that "mental attitude and state of training which renders obedience instinctive under all conditions," known as discipline, may prevail in his character and future conduct.

In order to attain this highly desired state, the individual responsible for the training at once runs afoul of that very thin dividing line between discipline and morale, beyond which one of these qualities may not advance without the weakening or destruction of the other. In my mind, the two are inseparable and of no value when divorced. The Army is spending millions in the study and service of "morale" and many times this expense and effort in some organization has been nullified by the improper application of training methods on the part of some officer with no conception whatever of individual or mass psychology or even the simple fundamentals of human understanding.

Let's start at the beginning with a cadet. He was a civilian or former soldier from either an average or above the average station in life and more often than otherwise just a student in school when he answered the call to arms and the urge to fly. He suddenly found himself in the midst of a wartime Army made up of other civilian, nonprofessional soldiers and officers together with the highly trained "regulars." He had heard that this same kind of Army learned from the last war that a more democratic policy and a closer relation between officers and men had made it then—and has made it now—the most efficient and loyal army, with the highest degree of morale of any armed force on earth. Yet, since he had become a cadet, it's quite possible that he had come all the way to the graduation ceremony without any personal evidence that such a condition even existed.

Discipline is probably the most important element in the training of any regimented mass of men who must function together or in co-ordination with other groups of men. Even the technical or professional use of their weapons or equipment is of little team value unless under the perfect control of discipline. The only problem in my mind, therefore, is the proper way to instill it in a group of men so that it becomes an integral part of their voluntary mental process rather than just a veneer worn for special occasions when some officer is present to use the authority rank gives him. All of which brings us to the question, and the answer, leadership. On this, and on this alone, depends the success of any military mission, either in training or actual combat.

There are few officers who can be strictly "iron pants" to the extent of being utterly devoid of human sympathy, a sense of humor, interest or pride and satisfaction in their men and ever command respect, loyalty or affection.

Any officer, by virtue of his rank, is in position to impose his will on the men under him. Yet if abusing that authority is his only claim to the title, he is not the kind of officer this, or any other army needs, although he may rate himself a great disciplinarian.

Unless an officer, by his own ability, deportment, courage and fair dealing can command respect and loyalty in his men, he may look behind him some day in this war, when the going is tough, and find them all AWOL, except the few taking a bead on the back of his neck. And that kind of shooting is not the result of proper discipline.

When a cadet enters preflight he is starting from scratch in Army drill, customs, courtesies and other disciplinary phases of training. From there through his basic stage he must get it without relenting, so that it finally becomes a part of him. Even through these stages, however, a spade can be called a spade without hitting him over the head with it, and a command or a reprimand can be given in a strictly impersonal and military manner rather than with the tone or attitude of a personal insult. It is foolish and entirely unnecessary to treat them as children or some low form of animal life. Such only breeds resentment and antagonism in their minds to the point that any requirement you have of them must be demanded and enforced, whereas, with a different attitude it might be yours for the asking. I have had many tell me, after graduation, when discussing their training, that they have gone to the flying line day after day so mentally tense and upset from bitterness and resentment of personal treatment they were unable to relax enough in the cock-pit to get anything at all out of that period of training. I have had many also tell me that mine was the first "At Ease" to be given them regardless of how long they had been standing at "Attention" talking to an officer. Another expressed his appreciation of the fact that some officer had said, "Good morning," as he returned a salute. These are little things that I did not realize were of any importance. Yet having them called to my attention brings forth the unreasonable argument that so long as a man knows how and when to snap to "Attention" and does so, then an officer might well live up to his part of the procedure, which requires that no man be kept in that position any longer than necessary.

In other words, a man's entry into the Army is the beginning of a two way obligation. His is to obey orders, accept any type of training or duty prescribed, keep himself clean and conduct himself in a manner reflecting credit to the service. The Army at the same time obligates itself to place that man in the charge of an officer qualified to clothe, train, and feed him; safeguard his health and personal welfare; administer and protect his military affairs and interests; advise him on personal problems, and by every means available keep him happy both on and off duty. If that officer falls down on any part of his obligation, he usually gets a reaction in kind as a reward.

There is another angle to the making of a good officer, and that is the susceptibility of cadets to examples set by officers. Therefore, any officer concerned with their training should by his own appearance, manners and conduct, on or off duty, as well as the way he carries out his training function, stay acutely conscious of this fact at all times. I recently saw a Captain remain seated with his feet up on the top of his desk, collar open with tie slipped down, greet the Commanding Officer of the post in the presence of several cadets with a casual wave of the hand. If Army discipline irks them now, I'm sure they can hardly wait until they get commissioned so they can get as sloppy as that Captain was, particularly if he should happen to be any one of the "idols" which they each pick wherever they go.

When cadets arrive at an advanced school they are on the last lap. If they haven't absorbed enough military training, other than flying and technical lessons, to qualify them as officers, then it is time the Army finds it out before they are commissioned. You can't possibly determine what a man has in the way of ability, force of character, sense of responsibility or initiative until you give him some responsibility and the chance to demonstrate those qualities and prove that he is capable of thinking and acting along the right lines for himself.

During this last advanced phase, flying and gunnery take up much of the cadet's time formerly spent at drill. It seems to me that in addition to perfecting his flying technique and teaching him to shoot, the cadet should also be directed toward that mental transition necessary to his changing from the status of an enlisted man to that of an officer. He knows by this time what the service requires and expects of him, and he knows the difference between right and wrong where his conduct is concerned. If he is not qualified at this stage to think and act like an officer and be given a chance to display initiative, sense of duty, honor and other characteristics we should know about, he won't be a few weeks from now. Pinning the bars on him won't automatically make an officer of him—he must do that for himself, mentally, and if he fails that test now, it will be much better than waiting until after he is commissioned.

He should be kept reminded that regardless of how high he might go in rank, he must still be governed by regulations and be subject to discipline in his duty and living. Still he must be made to feel that he is a human being whose feelings you consider and whose opinion on various matters you are interested in and value. A few extra personal courtesies, without even approaching the line of familiarity, go a long way in eliminating the low outlook on life and a possible inferiority complex they may have acquired along the line.

To sum it up, these boys have a big job to do and if, during their training we can let them know we are trying to turn out men in whom we have pride and confidence, it may help them to that very desirable estimate of themselves. ☆

ARMY'S FLYING WINDMILL

(Continued from Page 6)

mile and the ceiling to the tree-tops. It would, of course, have been possible to land at any time, but the pilot managed to get through by stopping in mid-air and then cautiously and slowly going around the wooded areas.

A great number of the landings and take-offs during the eight months of testing were made from a 20-foot square platform raised three feet above the ground.

The aircraft has hovered 20 feet above the earth while the observer climbed down a rope ladder to the ground and later climbed back to the ship. This foreshadows the practicability of landing or retrieving personnel in wooded or jungle country where even the helicopter could not land.

On low-pressure floats, the aircraft can land on any type of surface—on ground, water, marsh, snow or thin ice. Since it needs no prepared landing field, the helicopter may be able to provide excellent liaison and cooperation with ground forces. Because its forward speed can be reduced to zero, it can fly through visibility that is practically zero, literally feeling its way through the air by flying around trees and over buildings and hills. It also could be operated as an elevated observation platform for the direction of artillery fire, direct-line telephone conversation being practical if desired.

Despite its slow speeds, the helicopter probably would be less vulnerable to enemy attack than would a liaison plane because, having no wings, it is more difficult to see. Because it can hover stationary in the air, it also could be camouflaged to blend with ground colors. Nevertheless, such aircraft, lacking defensive armament, would not be expected to subject themselves to attack.

For night missions this aircraft would be a real threat in behind-the-line operation. The exhaust could be easily muffled; no propeller noises exist. It therefore could operate in almost complete silence.

Other operations that might be performed by a helicopter in combat areas include: the landing and rescue of agents at night in enemy territory, transport of personnel and critical material to inaccessible locations, rapid evacuation of wounded near the front lines, limited types of bombardment, photography, and the unreeling of communication wires over rugged terrain.

According to some authorities, the helicopter might operate from the decks of merchant vessels in convoy, searching out submarines and dropping depth charges directly on them when discovered.

Despite the successful experiments with the helicopter, there still remains a tendency to regard the aircraft as an interesting phenomenon of little practical utility. However, competent authorities believe that present knowledge is adequate to design and construct a successful helicopter of approximately 6,000-pound gross weight which could carry a useful load of nearly 50 percent of the gross weight. Although high speed is not of first importance, it should exceed 100 m.p.h. Range, endurance and military load capacity would be ample for many missions—missions hitherto impossible or extremely dangerous because of the limitations of high-speed aircraft.

THIS FIRST AAF helicopter was manufactured by Vought-Sikorsky after many years of development and experimentation by civilian engineers of the manufacturer and engineers of the AAF Materiel Center.

It is a two-place cabin ship powered by a Warner 165 hp. engine. It has one main lifting rotor and a small vertical tail rotor with variable pitch blades that serves to correct the main rotor torque. The pitch control mechanism of this tail rotor is connected to the rudder pedals, which also gives directional control.

The pitch of the main rotor blades may be increased or decreased at will as they pass any desired point of rotation with a corresponding but opposite variation of pitch at 180 degrees. This is called "azimuthal" or "cyclic" pitch control, and by this means lateral and longitudinal control are obtained. This pitch control mechanism is actuated by the stick, which acts in flight much like a normal control stick connected to aileron and elevator, except that in the case of the helicopter all controls are fully effective at zero forward speed.

Climb and descent are obtained by simultaneously increasing or decreasing the pitch of all main rotor blades, together with use of the throttle. This is termed "collective" pitch control. Since an increase of rotor pitch requires more horsepower to maintain the rotor at whatever r.p.m. is desired, there is a synchronizing mechanism that opens the throttle as the pitch is increased and thus maintains nearly constant engine and motor r.p.m. despite pitch changes.

Of course, there must be a clutch and transmission between engines and rotor, and also a "free-wheeling" device to permit blades to continue turning if the throttle is closed or the engine fails. In the event of engine failure, the helicopter becomes, in effect, an autogiro with all the slow landing characteristics of the autogiro. This is not theory. Not only has the helicopter purposely been landed without power, but there have been instances of actual engine stoppage where such landing was a necessity. Also, normal descent from altitude to near the ground is made without power and with the blades in auto-rotation. This point is stressed, for many ask "What happens in the event of engine failure?"

Perhaps it would be interesting to go through the motions of flying the ship.

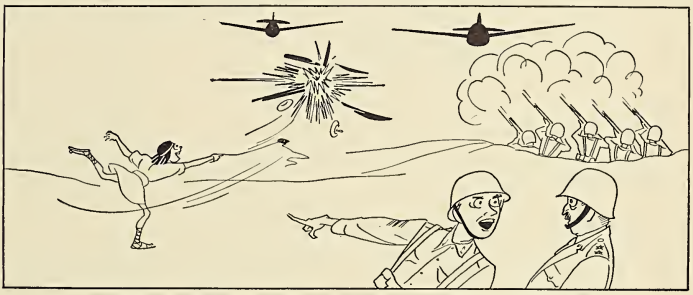
With the rotor clutch disengaged and the rotor brake on, the engine is started in a normal manner. When ready to take off the rotor clutch is engaged with the main pitch control in low pitch position. The rotor blades are now turning and the stick and rudder held in neutral. The rotor is now brought up to desired r.p.m. and the pitch of the blades increased until the ship leaves the ground in vertical climb.

By slight adjustments of the controls the aircraft may be held stationary a few feet from the ground—or at its vertical ceiling—as long as desired. When forward flight is desired, the stick is pushed forward somewhat, the ship noses down slightly, picks up speed and commences to climb, since less power is required for level forward flight than for hovering.

Not only is it possible, but quite normal, to fly the ship backwards, sideways, or to revolve on the ship's vertical axis over a fixed spot. In flight, stick and rudder operate much like those of a conventional "frozen wing" aircraft, except that they are quite sensitive and the tendency is to overcontrol. There is one difference, however; control over climb is a function of the main pitch control in conjunction with the throttle. This, at first, is confusing to the pilot accustomed to fixed-wing airplanes.

Through the many months of experimental flight testing, the Army Sikorsky Helicopter turned up only minor mechanical bugs, which is an unique record in the history of new-type aircraft. It had a motor failure in flight once, but it just windmilled down to the ground.

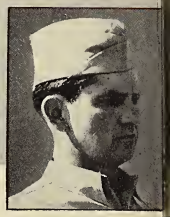
That's the way you bring it down: cut the motor and glide down like an autogiro. Forced landings are little different from normal autogiro landings. Normal helicopter landings, however, are made with power, the craft touching the ground so gently that even eggs are not broken. This actually was tried on one occasion by suspending a net with a dozen eggs below the helicopter. Not an egg was cracked on touching the ground. ☆



"He says his name's David—he's already brought down ten of 'em!"
—SLIP-STREAM

Air Forces

A monthly record of decorations awarded to personnel of the Army Air Forces.



Sgt. J. C. Komurke

Lieut. H. A. Jolly

Lieut. G. M. Heiss

Lieut. C. B. Kelsey

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*Posthumous

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Lieut. J. H. Disbro

Lieut. F. B. Bender

Lieut. W. G. Ivey

Capt. J. A. Glenn, Jr.

Lieut. D. C. Everitt

eut. U. P. Thorington

Capt. Samuel Maddux

Lieut. D. E. Good

eut. W. B. Drysdale

Lieut. Raphael Bloch

Sgt. J. D. Sullivan

Wessman, Marion L. Wheeler, Thomas R. White, John R. Wilcox, Paul I. Williams, P. LaF. Willis, Milton E. Wills, George H. Wilson, Robert R. Wilson, Edward R. Yerington, Lucian N. Youngblood, Richard E. Zahm, Frank W. Zatzke, Mitchell Zawisza. **MASTER SERGEANTS:** Elmer L. Dreirr, Anthony A. Kuzdrall, W. K. Sheffield. **FIRST SERGEANT:** Wilbur K. Hunt. **STAFF SERGEANTS:** Ralph Alexander, Vernon D. Berg, F. A. Bumgardner, Richard M. Cullison, Henry V. Earnest, Robert D. Fortier, Benjamin L. Hale, James W. Hanna, Sidney C. Howe, James H. Leaman, Noel W. Meek, James R. Milliren (Also Soldier's Medal), W. J. Mroczko, Ralph M. Pelkley, Averid F. Perkins, A. K. Santowski, H. F. Skelton, David A. Tunno (Also Soldier's Medal), Louis L. Walters, Lacey A. Whitley. **TECHNICAL SERGEANTS:** Robert L. Barlow, Glenn H. Carlsgaard, Julius G. Doka, Wilson Ford, Tommie T. Harris, Albert M. Hopkins, Robert J. Kastning, J. C. Komurke, W. W. MacConnell, Bonnie V. Nabors, Gust D. Portl (Also Air Medal), C. Racioppo, Ray S. Storey. Don Tennison. **SERGEANTS:** Michael G. Adamow, Roy E. Baker, Lavern E. Bechtel, Leslie R. Brown, Junia K. Bryning, Reuben A. Carr, James A. Carter (Also Purple Heart), Ralph W. Chorn, Robert A. Cothern, Vernon O. Elder, Marshall J. Engstrom, Robert J. Forsyth, Robert W. Freeman, Edward Gosk, Kenneth A. Gradle (Also Oak Leaf Cluster), James L. Hickey, Gene E. Hickman* (Also Purple Heart*), Joseph M. Hines, Cyrus Foster Johnson, Jr. (Also Soldier's Medal), Harvey D. Joyner, Glenn C. Keclik, Donald L. Kerns, John Kominicki*, John E. Lang, William J. Law, Herbert M. Lemke, J. F. Marling, Albert C. Nichols, A. T. Patrick, A. H. Richardson, Bufford D. Robin, David Runager, Joe C. Saia, Ralph Sam, R. W. Senteney, Jack D. Smith (Also Soldier's Medal), Jack H. Stull, R. E. Thornock, James H. Webb, H. C. Worden. **CORPORALS:** Gordon W. Barton, John J. Beatty (Also Soldier's Medal), Floyd R. Blair, Walter T. Buchanan, Donald V. Chapman*, James K. Connolly, Robert J. Coutre (Also Air Medal), Anthony Filippi, William C. Gregory, Leonard L. Hendry, James T. Hughes, Lawrence Johnson, Herbert L. Kerley, Albin F. Lenander, P. B. Lowrie, Robert McManman, Donald C. Meagher*, William H. Nichols, Harold L. Osgood, James R. Peterson, J. N. Powers, Edwin C. Smith, Abraham Tabakman, J. Troyanowski, Lewis E. Williams, Jr. **PRIVATES FIRST CLASS:** Edward C. Lohr, J. P. Miszczuk, L. Schleifer*, J. D. Thompson, E. F. Vernick, Benjamin J. Xerri, Alexander Zaretsky. **PRIVATES:** Robert S. Brown, E. L. Phillips (Also Purple Heart), H. J. Purdue, Alvin Troyer.

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COLONEL: Henry H. Reilly. **MAJORS:** Kenneth R. Kreps, Floyd W. Rogers. **CAPTAINS:** Louis Halperin, Sam Maddux, Jr., Carl E. Wuertele (Also Distinguished Flying Cross). **LIEUTENANTS:** G. C. Beale, Roy L. Callaway, John H. Dis-

(Continued on next page)

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A monthly record of decorations awarded to personnel of the Army Air Forces.

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*Posthumous


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Capt. Samuel Maddux


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LIEUTENANT COLONEL: Roscoe T. Nichols, Jr. **LIEUTENANTS:** Thomas J. Burke*, Sherman A. Copeland, Therman L. Patrick, Norman B. Willey. **FIRST SERGEANT:** Lloyd E. Swope. **STAFF SERGEANTS:** J. B. Bowers, Robert W. Gabriel. **TECHNICAL SERGEANTS:** M. C. Shelnutt, Thomas P. Walsh. **SERGEANTS:** Clarence J. Cole, Acy B. Duhon, Gordon G. Farrell, Charles J. Hoffman, Harold J. Jackson, William A. Karges (Also Oak Leaf Cluster), John Klingenhage, Robert G. Lee, W. G. Richards, Henry E. Swartz, Harvey H. White, Lacy W. White, Jr. **CORPORALS:** Douglas H. Dickerson, Manuel D. Guerra, Lloyd N. Lovell, Don J. Spiers, Albert H. Squires, Earl Thalwitzer. **PRIVATES FIRST CLASS:** Frank Tino, Jr., Ray E. Wisdom. **PRIVATES:** C. D. Cooper, Murray N. Goldstein, Gordon Harrison, Harold V. Keahey, V. T. Pierrellee, Michael V. Repko, W. S. Smart, Charles M. Steward, Orbin R. Truett, S. B. Ziolko.

AIR MEDAL

COLONEL: S. J. Davis. **LIEUTENANT COLONEL:** Fred M. Dean. **MAJORS:** D. B. Avery, C. B. Collier, Glenn E. Hubbard, Claude Putnam, R. F. Rudell, C. F. Skannal, Harrison Reed Thyng (Also Oak Leaf Cluster to Air Medal), John W. Weltman, John O. Zahn. **CAPTAINS:** K. B. Benson, C. A. Christmas, L. F. Deegan, W. T. Duden, Thomas B. Fleming, Joseph A. Glenn, Jr., James Harman, Edward G. Johnson, George J. LaBranche, R. E. Lehr, W. M. Lively, F. H. McOlgin, F. J. Miller, Homer H. Noss, R. A. Nowotny, Joel A. Owens, Jr., F. L. Perrine, T. H. Runyon, W. A. Tesch, Kenneth D. Vandayburg, J. B. Wakefield, Victor Emanuel Walton, Darrell G. Welch, Charles E. Wilson. **LIEUTENANTS:** Lyle Albert Bean, Robert N. Chenoweth, W. B. Drysdale, David R. Everett, Elmer Hartman, William K. Hester, Earl W. Hille, Jr., Jack M. Ilfrey, Earl C. Kent, Stephen N. Krenytzyk, J. C. H. Lentz, William K. Long, R. W. McWherter, H. O. N. Mendenall, Howard Warren Millard, M. C. Morrison, R. D. Neale, Jr., Edward S. E. Newbury, Charles W. Oakley*, L. B. Page, James E. Pate, W. S. L. Pennington*, W. M. Pringle, Jr., Robert B. Riley, N. O. Roberts, George L. Ross, Richard H. Schoenberger, Joseph D. Shaffer, E. E. Shahan, Henry K. Smith, D. O. Starbuck, Roger F. Stemen, R. L. Stevens, J. A. Sullivan, Carlus Turner, E. F. Umphrey, Burton L. Weil, Norman L. Widen, Bill F. Williams, R. E. Williams, J. L. Wolford. **MASTER SERGEANT:** Joseph H. Sitlik. **STAFF SERGEANT:** Frank S. Tamsett. **SERGEANTS:** John Burger, Ira C. Robertson. **CORPORALS:** Jelacio M. Canapi, Robert W. Skarie. **PRIVATE:** James N. Thomas.

OAK LEAF CLUSTERS

BRIGADIER GENERAL: Caleb V. Haynes. **LIEUTENANT:** Cecil E. Gregg. **STAFF SERGEANT:** Douglas V. Radney. **SERGEANTS:** Lewis Coburn, Clevis Jones.

AMERICAN VOLUNTEER GROUP DISTINGUISHED FLYING CROSS

For gallantry in action while members of the now disbanded American Volunteer Group in China:

SQUADRON LEADERS: Robert Neale, John Van Kuren Newkirk*, Franklin Rector, Robert James Sandell*. **SQUADRON VICE-LEADERS:** Charles Rankin Bond, David L. Hill, Frank Schiel*. **FLIGHT LEADER:** R. L. Little*.

WHAT YOU SEE WON'T HURT

(Continued from Page 5)

planes have red noses, all Axis aircraft usually have white noses (although they might be yellow, too) and usually white wing tips. If you don't see these tiny objects first you probably won't see anything at all afterwards. But, if you have seen them, the next thing you'll view will be a streak or several streaks looking somewhat like a meteor traveling in the direction of the bombers (if you're acting as escort). Here you point your nose in the path ahead of this object and press the trigger at the same time, always looking behind, however, to make certain that a tiny spot has not suddenly become a very large white or yellow spinner with little flashes coming from it. If you find that the latter has occurred, you can do one of three things. First, and best, is to turn hard; second, to throw your stick and rudder into one corner (any one that suits you, but also hard); and third, if you are too terrified to perform either of these maneuvers, trim the ship in neutral, undo your safety harness and run like mad around the cockpit calling for help on the radio. (In all fairness, I advise the last procedure only in cases of dire necessity, because it doesn't always work so well.)

Anyway, those are the principal sights you'll be seeing, but there are also a few more. For instance, you might see the little meteor disappear straight down and then suddenly find that an aircraft has been catapulted straight up into the air from the ground to the bombers. Another odd, but frequent occurrence is to have the dirty little dart emerge inverted. (His mother was scared by a tree sloth). The 109 functions perfectly upside down and the pilot only has to pull back on the stick to get away.

Don't depend on recognizing enemy aircraft by their crosses or faces alone. Learn the differences between the ME-109s E, F, and G, the FW-190, the Macchi and the others as regards their wing tips, tails, spinners, etc. Aside from the fact that your intelligence officer is always curious as to exactly what you were fighting (and can deduce much interesting information thereby), your No. 1 will dislike you lots if you confuse his tail with that of a 202 or such.

To sum up, first of all remember that you can always recognize the Hun by his position and actions in the sky. He has a more or less set pattern, as was illustrated at the beginning of this piece. In the second place, be able to recognize his plane so that if you should ever get a long enough glance at it you can tell the I.O. what it was. Finally, look before you press the trigger. Your own pursuit pilots usually get a little angry if you fire at them, but the bomber boys get hopping mad and might shoot you down. ☆

PICTURE CREDITS

6-7: Sikorsky Aircraft. 8-9: Wright Field, AAF and Life. 10-11: Lockheed-Vega Aircraft and Hans Groenhof. 34-35: Curtiss-Wright Corp. and Lockheed-Vega Aircraft. All other photographs secured through official Army Air Forces sources.

servation for their instruments. Once this conviction is arrived at, there is no cure —it is invariably fatal. An instrument of this type is the Astro-Compass, shown in an accompanying photograph. It is used to try to explain away some of the confusion. Although such attempts at explanation seldom succeed fully, it may be of interest to follow the line of reasoning used.

The Astro-Compass is a simple equatorial telescope mounting, such as is seen in any observatory, in which a split-pupil collimator sight is substituted for the telescope. In principle the Astro-Compass is *exactly similar* to all "arc" reduction methods. Suppose the instrument is levelled and is oriented in azimuth by motion 3 (see illustration). Then, using the time selected for observation, extract the declination of the body to be sighted from the Almanac and set it on the instrument. The sight now can be pointed exactly at the selected body by motions 1 and 2. When the instrument is so sighted latitude can be read from the scale used in conjunction with motion 1 and LHA (and therefore longitude) from the scale used in conjunction with motion 2.

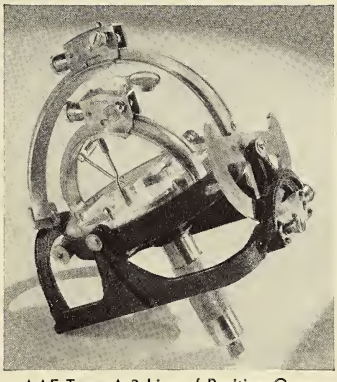
It must be noted carefully that *two* combinations of motions can be used to point the sight of the levelled instrument on any body in the sky. The two independent combinations of motion are 1 and 2, and 1 and 3. A combination of the motions 1, 2 and 3 can accomplish the same result. However, *if one of the three settings is in error, all are in error.* Therefore if the latitude and longitude are to be obtained from the instrument with reasonable and usable accuracy then the azimuth (motion 3) must first be set with reasonable accuracy (*true north* plus or minus 5 minutes of arc). The inability to achieve such accuracy in the azimuth setting is the one and only reason why latitude and longitude cannot be obtained from a single observation.

THE directness of reducing an observation by plotting it directly on a small sphere by means of a great circle "ruler" and a small circle, "compass" has appealed to a few people since time immemorial. These individuals founder on the question of "scale." They will go to great lengths to devise an assortment of micrometer and vernier scales and compasses to achieve the required accuracy when, in the final analysis, the accuracy obtainable is dependent on the visual acuity of the user. This type of instrument is a plotting device, pure and simple, just as is a drafting board, T-square triangle and ruler. The draftsman's accuracy depends not upon an assortment of verniers, micrometers and finely divided scales but upon his visual acuity, the sharpness of his pencil and his skill in using it. Increase the sharpness of his eyesight with a reading glass and his accuracy increases in proportion. The same applies to the "spherical draftsman" whose pencil line is from five to ten miles in width to begin with.

The "arc" and "sphere" machines are very conducive to an assortment of gymnastics when used in the air. Though the inventors of these machines invariably recommend the lap, the user generally winds up his problem with the instrument on a table and himself in a head-stand. Using the instrument in the laboratory and in the air is comparable to writing a letter in a study and in a typhoon. For instruction purposes, a system similar to this one recently was advocated by Yale University. It had been used as far back as 1934 in Air Corps Navigation Schools.

Navigators disagree as to the size of a sphere needed for acceptable accuracy, some claiming that only a five-foot sphere is necessary but others contending that a diameter of fifteen feet should be the minimum.

In spite of the drawbacks of the arc and sphere, they have some ardent supporters. Recently a well-meaning business men's publication levelled a scorching barrage of



AAF Type A-3 Line of Position Computer; too slow for standard use.

vicious invective at the American armed services for not going hook, line and sinker for the twelve-inch sphere of a civilian sportsman pilot. Although the particular device had been put through its tests seven years ago, the Materiel Center had invited the inventor to submit sample articles and cost quotations. Re-examination of a device previously abandoned is sometimes a waste of time and money—but the technicians of the Air Forces Instrument Laboratory constantly search for improvements, regardless of the ability of the inventor.

Other appealing graphical devices suffering from "scale" trouble, include the D'Ocaigne Nomogram and the system of superimposed stereographic projections tangent at the equator. Fortunately, these are the products of astute students of navigation and have been presented not for actual air use but as interesting novelties.

Although it is impossible to revamp the navigation equipment and training of the Army Air Forces overnight, many 1942 developments are rapidly being adopted as standard procedure for combat navigation.

Plotting equipment essentially is of the conventional type of protractors, compasses, parallel rules and a scale adequate for all plotting purposes.

ALTHOUGH there are in existence many computers for the solution of the wind triangle and of speed-time-distance problems, the E-6B dead reckoning computer, which was adopted as standard equipment in 1939, is unquestionably one of the most versatile in the field. This computer has met universal favor among navigators and pilots who are required to perform routine dead reckoning problems.

The several systems and methods used by the Air Forces for the reduction of celestial observations are the Astrograph (adopted in 1942), the Star Altitude Curves (1937) and Hydrographic Office Publication 218 (1942), 214 (1937) and 211.

The Astrograph and the Star Altitude Curves are systems similar in principle. The advantages of speed and simplicity favor the Astrograph although the Star Altitude Curves have slight accuracy advantages.

Hydrographic Office Publications 218 and 214 are alike in principle and in accuracy. Since 218 is considerably faster and offers less chance to err because of its superior arrangement, it will completely replace 214. The Astrograph also will replace the Star Altitude Curves in Air Force navigation.

Hydrograph Office Publication 211 is retained for polar work, above latitudes of seventy degrees.

As a goal for inventors who are striving to improve the navigation systems of the Army Air Forces, the respective accuracies and times required for reduction of a two star fix in the several Air Force systems are as follows:

	Accuracy	*Time of Reduction*
Astrograph	±2 miles	1.5 min.
Star Curves	±1.5 miles	2.0 min.
HO 218	±0.5 mile	4.0 min.
HO 214	±0.5 mile	5.0 min.
HO 211	±0.5 mile	10.0 min.

The time required by mechanical devices for the reduction of a two body fix generally approximates ten minutes with an accuracy margin of from five to fifty miles.

Navigation systems, the same as airplane designs, are compromises. The devices and methods adopted by the Air Forces represent a compromise between accuracy and speed of reduction. Still, this compromise has not yet been matched by any of the hundreds of mechanical devices submitted.

Despite the unequalled practicability of the Air Force systems now in use, Wright Field continues to examine new devices and methods proposed by navigators and non-navigators, constantly striving to be of more assistance to the combat navigator who often must be a gunner, a radio man, a bombardier, or a co-pilot, in addition to his other duties.

Planes occasionally are lost by the human error of the navigator. Wright Field's objective is to develop devices and methods that will eliminate all possibility of human error. ☆

Technique

A Monthly Review of Technical Developments in the Air Forces

TWO NEW WARPLANES

Shown above during a test flight is the new Curtiss A-25 dive bomber. Christened the Helldiver, after its Navy counterpart, the A-25 has greater speed, range and striking power than any dive bomber now in action. The plane is already in production at Curtiss-Wright's Missouri factory.

TWO NEW Army Air Forces planes have been announced: the Lockheed C-69, a four-engined high altitude transport, and the Curtiss A-25, an Army version of the Navy's famed Helldiver, recently voted the "world's best dive bomber" by British aviation experts.

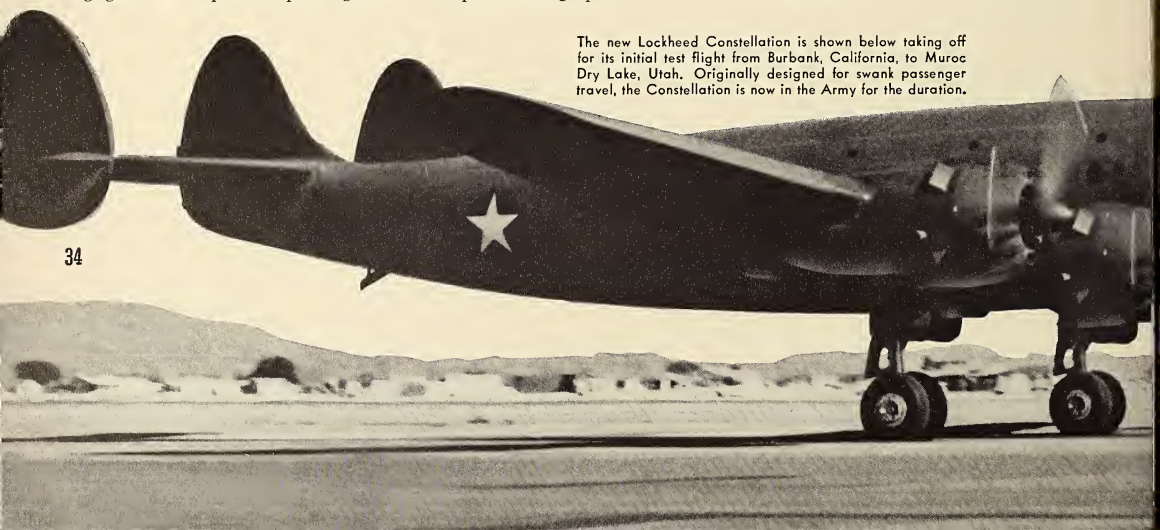
The C-69, named the Constellation, is a big, long-range speedy airliner with a pressurized cabin for high-altitude flying. It is capable of carrying 55 passengers and a crew of nine from coast to coast in less than nine hours, or of flying a light tank and a complement of troops across the Pacific to Honolulu in twelve. Although one of the largest airplanes in the world, it uses but one gallon of gasoline per mile when fully loaded.

The new transport is powered by four Wright Cyclone 18-cylinder engines, of 2,000 horsepower each. It has tricycle landing gear, two separate superchargers to keep the sealed cabin comfortable at all altitudes, hot-wing de-icing and new-design streamlined nacelles that avoid compressibility shocks on the nose cowl.

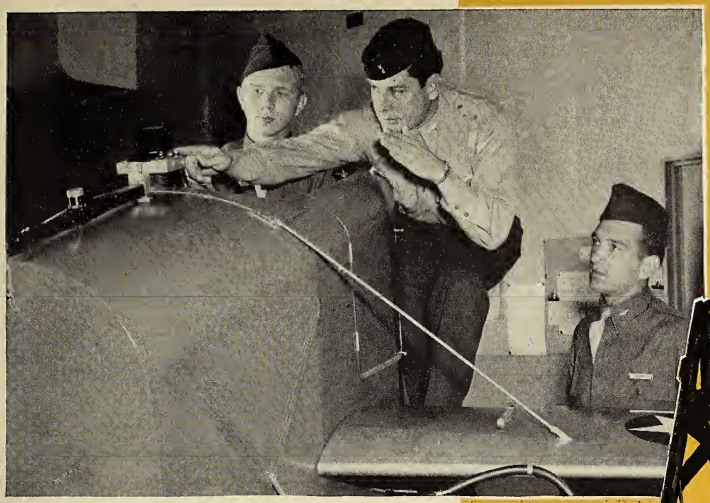
A distinguishing feature of the C-69 is its three vertical tail fins. These aid the pilot in controlling the plane at high speeds and enable it to fit in ordinary sized hangars. Each engine is an independent power source and can be completely replaced in 45 minutes. The wings are similar in design to those of the Lockheed P-38. The Air Forces will use the C-69 as both a troop transport and cargo plane.

The A-25 is a two-place, mid-wing dive bomber powered with a 1700 horsepower Wright Cyclone engine and equipped with a Curtiss electric propeller and retractable landing gear. The first A-25 was test flown sometime ago. It was presented formally to the Army at a special ceremony in the Curtiss Missouri plant, where Helldivers roll off a four-block-long assembly line.

The Army Helldiver design is very similar to the Navy design, and, with minor changes that can be made in the field, the planes can be used interchangeably by both services.



The new Lockheed Constellation is shown below taking off for its initial test flight from Burbank, California, to Muroc Dry Lake, Utah. Originally designed for swank passenger travel, the Constellation is now in the Army for the duration.



Lieutenant Paul Greene exhibits the fine points of aerial gunnery on a gun-equipped Link trainer.

Two New Gunnery Training Techniques

ALMOST every month the ingenuity of Air Force officers results in further aids to gunnery training. Two of the latest are at Foster Field, Texas: a skeet tower and a special BB gun mount for link trainers.

The purpose of the tower is to prepare prospective gunners for the many angles of fire they will encounter in modern bomber turrets. From platforms of ten, twenty and thirty feet students learn how to shoot down, as well as up, at fast-moving targets.

The BB gun mount uses to advantage the maneuverable cockpit frame of the link trainer. With it cadets learn to "lead" moving targets that are speeding around a circular track, thus acquiring firing practice without leaving the ground. The device is unusually valuable because it can realistically simulate aerial gunnery effects.

—*Captain Malcolm B. Allen, Foster Field.*

(Continued)

Gunnery students practice their all-important game of skeet from the 35-foot tower at Jackson Field. The various platform levels give gunners the "feel" of shooting from different angles.

New Flying "Hood" A Safety Factor

Turner Field, Geargia, has accamplished a revalutian in the field af blind flying haads.

Old-style haads were made af heavy, black cloth. In side-by-side, multi-engine trainers such as thase used at Turner, this had many disadvantages. The student, completely encased in the haad araund the pilat's seat, cauld nat see his instructar (in the ca-pilat's seat) ar the engine instruments an the instructar's side af the cackpit. The instructar, an the ather hand, cauld nat see his student ar the flight instruments, and had no visibility aut the left side af the plane.

Nat anly were these limitatians incanvenient, they were dangeraus in the busy air araund a large training center such as Turner Field.

Sa tests were begun to locate a substitute for the ardinary black-cloth haad. One was faund. It is a ruby acetate filter that can be placed an windshields. When viewed thraugh a pair af blue-green aptical gaggles this filter presents a salid black appearance, but when viewed with the naked eye it is perfectly transparent.

The results are excellent. With the new system the student wears gaggles and the instructar daes nat. This gives the student an excellent view af all the instruments, the interiar af the plane and the instructar, but prevents him fram seeing autside the cackpit. The instructar, an the ather hand, has a full view af autside traffic in additian ta being able ta watch the student and his handling af the flight instruments.

The use af the new filter and gaggles has been sa successful that 95 percent af all training planes at Turner are equipped with them.

Mobile Flood-Light

An inexpensive but highly-efficient mobile floodlighting unit for auxiliary fields has been designed and constructed at Mather Field, California, by twenty-year-old Technical Sergeant James L. Hancock, working in conjunction with First Lieutenant Clyde C. Cramer of the Post Operations Office.

The new unit, which can be used as a substitute for both the regular J-3 and portable B-3A floodlighting systems, consists of a five-kilowatt motor generator mounted on a one-ton, two-wheel cargo trailer. A framework of two-by-six timbers on the rear end supports four light heads from the B-3A portable light. This frame may be tilted forward or backward to obtain different angles of field illumination, and the entire unit may be swung in a horizontal arc on the trailer wheels.

The picture abave shaws haw Waco Flying Schaal's portable cantral tawer can be aperated an auxiliary landing areas. It generates its awn pawer, thus eliminating autside attachments, and can be transparted by jeep.

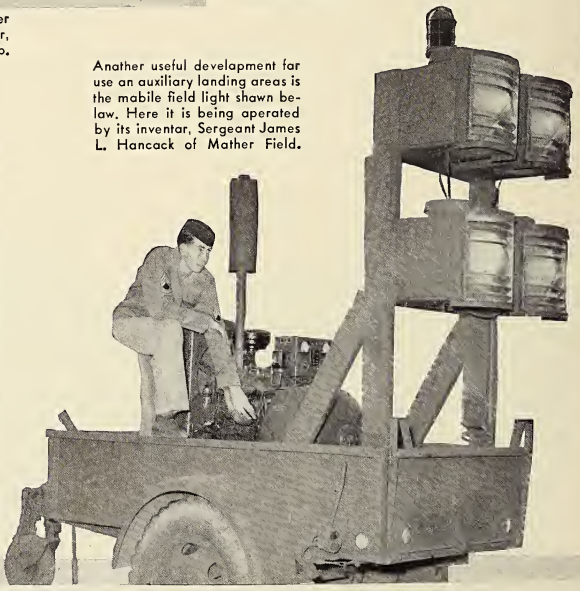
Portable Control Tower

A mobile control unit, to do the job at auxiliary airfields that control towers normally do at completely-equipped bases, has been developed and put into operation at the Waco Army Flying School, Texas, by Technical Sergeant John T. Skinner.

Before the development of Sergeant Skinner's device "control planes" stationed on the ground had been used as control towers during night flying to transmit and receive messages from cadets in the ships aloft. After hours of radio work, batteries on these control planes often ran down so badly they wouldn't turn over the planes' engines. When this happened a spare battery — and a crew to install it — had to be brought from the home base, often miles away, before the "mekiwi" could be put back into commission.

The new mobile control board has ended all this. Now a complete communications system is brought right to the auxiliary field before operations start. It is transported on a jeep, can be dismounted by one man and placed in service anywhere within a matter of seconds. The complete equipment, plus a service battery and a spare, is mounted on a two-wheel chassis that can be easily moved about. No outside attachments are necessary.

Anather useful develapment far use an auxiliary landing areas is the mabile field light shawn belaw. Here it is being aperated by its inventar, Sergeant James L. Hancack of Mather Field.



THERE IS MUCH MORE to the technique of flying than just knowing how to operate an airplane, as aviation cadets soon find out. For one thing, the finished pilot must know how to find his destination. The Randolph Field cadet above learns this all-important technique with the aid of a compass, a speedometer, a watch and a map. The compass tells him his direction, the speedometer tells him his speed, the watch tells him how long it should take him to reach his objective at a given speed, and the map provides him with check points to measure his progress.

One More Hoist

ANOTHER portable boom hoist for use with two and one-half ton government trucks, similar to that described in the January issue of AIR FORCE, was independently designed and built in the spring of 1941 at another Air Forces installation, according to information furnished by Colonel P. E. Ruestow of the Directorate of Base Services in Washington, and Colonel J. M. McCulloch, Assistant Commandant of the Air Service Command Base at Orlando, Florida.

Designer of the hoist was Captain E. D. Grana, then a master sergeant and foreman of the base engineering shops at Mitchel Field, New York.

Captain Grana's hoist was first used during the summer and fall of 1941. It received much favorable comment at that time because of its ability to perform most of the work of the standard Air Force wrecking truck, and because it could cross extremely light bridges that would not support the comparatively heavy weight of the standard wrecker.

Since then the boom has been used extensively by the 91st Service Group, and has accompanied several contingents of the Army Air Forces to Iceland. Recently it has been put into use by the 25th Service Group.

OBSERVATIONS

(Continued from Page 17)

moving through cloud banks and overcast toward this destination. Red anti-aircraft batteries nearest the front were charging a modest price for admission.

At the farthest point of our own advance we were stationed with the division that had effected the junction between the north and south Red forces and had then wheeled eastward to hammer at the entrapped Axis forces.

Veterans of fifteen months of steady fighting, for twelve days and nights in the forefront of this offensive, this division typified the best that could have been found in any army. Their morale was high. The men were getting two hot meals daily and a third hot or cold.

On the crests looking toward enemy positions they had dug a new line of trenches, deep and heated with open fires.

Their commander, a bullet-chested Georgian only 34 years old, had just been decorated and made a Major General. The division had been designated a Guard Division for its outstanding achievements. The staff averaged under 30 and their reception to General Hurley was on a most friendly and cooperative man-to-man basis. They were proud of their handiwork and eager to display its every detail to us.

In the path of this army that had carried the brunt of the offensive southward and eastward we found all the vestiges of violent conflict, of death with suffering, of defeat and victory.

Numerous trophy dumps were piled high with rifles, bayonets, boots, helmets. Dispersed in parks were captured artillery pieces, much of it modern Axis-made ordnance, tanks and tank destroyers. At two captured airfields were wrecks of some 60 Axis planes—Focke-Wulfs, Heinkels, Junkers and an occasional Messerschmitt.

At one of the fields, everything had been caught on the ground by a dawn attack of Red infantry, tanks and light artillery. Nearly a dozen of the enemy planes were taken undamaged, we were told, and a major of the Red Air Corps, wearing the insignia of a Hero of the Soviet Union, described with evident pleasure how he had flown one of the Focke-Wulfs over Rumanian positions for reconnaissance.

A great air battle evidently had taken place above the second field and for miles around were scattered the remains of fighters, most of them marked with the swastika.

Already in operation under Russian hands were dozens of sturdy Axis trucks, most of them almost new. Also salvaged were numerous mobile machine shops, ambulances and radio trucks.

During the second half of our reconnaissance—that, on the Caucasian front—testimony to the effectiveness of the Soviet's defending air strength was given us willingly by a half-dozen young Axis air force officers in a prison camp up the Caucasus valley. ☆

Like the men it serves, AIR FORCE, the official service journal of the Army Air Forces, has many places to go.

Because of the limited number printed monthly, we need your cooperation in getting each copy to as many readers as possible at your station.

Pass this copy of AIR FORCE on to the other men in your unit as soon as you've read it. You'll be helping us to get the service journal to all the men of the Army Air Forces—all over the world.

DAWN OF A NEW ERA

(Continued from Page 7)

difference—only 45 true ground speed. At this point I began to worry about the oil temperature. The day was hot and getting hotter, and the oil had been slowly warming up until it approached the danger zone. It passed 80 degrees (centigrade) and crept on up toward 85. I didn't like it, and I watched it so closely that it didn't occur to me until afterward that I was at that moment setting some sort of an unofficial record—flying a helicopter across a State boundary for the first time.

As Brewster drifted slowly by, I began to edge southward, because straight ahead, as far as my eye could see from 2,500 feet, there was an unbroken stretch of forest. The highway to the south at least offered promise of speedy assistance in case of trouble, so its winding ribbon became my temporary beacon.

The open fields of the Hudson Valley caught my shadow like a giant whirling spider far below. I began to drop down for the scheduled landing at New Hackensack, just outside Poughkeepsie. I was 35 minutes late, and it was pleasant to see George Lubben's shock of red hair come bounding from the hangar as I hove in sight. George was at this first stop to give the ship a thorough going over. As I came in range of the field he was talking by phone with the ground party who had gotten as far as Brewster and called to check progress.

On this first leg, besides crossing the State line, another record had been set, but not recorded so no official claim can be made for it: the national airline distance record for this type of craft was unofficially established at fifty miles (since no other helicopter in the Western Hemisphere had flown any appreciable distance before). We might also have claimed speed and altitude records, although three weeks earlier I had gone 82 miles an hour and climbed to 5,000 feet in this same ship.

Off from New Hackensack, I swung north toward Albany, flying about 1,000 feet above the valley floor. As I circled Albany airport, I elected to land at the end of the line of parked airplanes with the nose of the ship practically against the fence—something no other aircraft would ever consider doing. Everyone rushed from the buildings, expecting me to pile up among the automobiles in the parking lot. But the landing was made (as they always were) without incident. As I walked toward the hangars, someone in the crowd grinned, "What are you trying to do—scare the hell out of us?"

Another airline distance record on this leg—78 miles.

From Albany to Utica was uneventful except for the pleasure of flying safely up the Mohawk Valley with the hills on either side often higher than the ship. I felt like the Wright brothers, looking down from my transparent perch above the house-tops.

Farm-yards full of chickens and animals would suddenly become uninhabited as shelter was sought from this strange hawk—but the yards would quickly fill again as houses and barns ejected groups of human beings gaping skyward.

At Utica I drifted up sideways in front of the hangar and hung there stationary for a minute or so while mouths opened wide enough to land in. Then I slid over to the ramp and squatted down. The guard greeted me as I walked up to the office: "I don't believe what I saw just now. Of course, I realize this is a secret ship, but do you mind if I look again when you take off?"

World's endurance record for helicopters exceeded on this leg: 1 hour, 55 minutes (20 minutes longer than the existing record held by Mr. Sikorsky). Also, another four miles added to my previous airline distance record, bringing it to 82 miles.

Flight Summary

Five days; 761 airline miles; 16 separate flights; 16 hours, 10 minutes elapsed time; four States covered; first helicopter delivery flight completed; unofficial American airline distance record repeatedly established and exceeded, finally to remain at ninety-two airline miles; first interstate helicopter flights (unofficial); first interstate helicopter passenger flights (also unofficial); world endurance record for helicopters exceeded with the flight of one hour, fifty minutes (most regretfully unofficial).

It was a beautiful flight from Utica to Syracuse, marred only by my constant concern over the mounting oil temperature which now pushed close to 95 degrees. The sun was getting low in the west, the air was smooth, and a gentle tail wind puffed me on my way. I was fifteen minutes ahead of schedule as I came into the Syracuse airport and hovered in front of the hangar where I thought we were going to house the ship. Suddenly a guard burst around the corner to direct me where to go. He stopped and spread his eyes, his jaws and his feet simultaneously when he saw me awaiting instructions fifteen feet up in the air. Recovered from his shock and reassured by my grin, he signalled me down to the other end of the field, and then dog-trotted along the ramp with the helicopter's nose a few feet behind and above him.

This first day had gone on schedule. The helicopter had proved itself an airworthy vehicle, capable of rendering true transportation. It had travelled 260 miles in five hours and ten minutes without even beginning to approach its high speed. But a quick inspection of the ship at Syracuse revealed one difficulty in this particular craft that was to give us our share of worry in the weeks to come. The transmission was heating up badly. It seemed strange that we should create a totally novel aircraft and run into no particular structural, functional or control problems—whereas a simple gear transmission, something that had been developed and used successfully in millions of applications during the last half century, was destined to hound our every move.

Off for Rochester the following morning, I kept the ground party and their yellow-spotted car in sight for several miles, but finally decided to cruise ahead at normal speed. It was a beautiful day, but the hot, calm air presaged thunderstorms. At the outskirts of Rochester, I noted that the main highway went straight ahead into the business district, while a small cross-road to the left led to the airport a few miles away. I lingered above the crossing, debating whether or not to hover there until our car came along and signal them the best route to take, but finally decided that in the interests of the over-heating transmission it would be best to go on to the port and check things over.

Above the field, I headed into the wind and slowly settled down facing the open hangar doors. Several men working inside ran for their lives, expecting a crash, but when they began to see that there was no danger they reappeared from behind airplane wings and packing boxes and watched the landing with unconcealed amazement. A guard came over and advised me to taxi up in front of the control tower at the other end of the hangar line. He didn't realize that in this strange craft a short flight was much more satisfactory than taxiing on the ground. His eyes popped open as I took off, still facing the hangar only a couple of hundred feet away, and buzzed along lazily, ten feet above the ramp and four feet above his own head.

The control tower was simply a square glassed-in box atop a fifty-foot skeleton tower out near the operations area. No ship may land without first receiving a green light signal from the control tower operator. It was fortunate indeed for me that my ship could hang motionless in the air, because when I whirred up in front of the tower and looked the operator in the face he was so astounded that he left me hovering there for the better part of a minute before he stopped rubbing his eyes. Then, with a broad grin, he flashed on the green light.

The transmission was still running pretty hot, so I decided to fly to Buffalo with the metal cowling removed from the sides of the ship for more air circulation. Off again, with a headwind and a promise of thunderstorms, I stuck close to the ground party so that if an intermediate landing was required they would be able to check the gear case a few minutes after landing.

Down the highway we went together. I knew they were pushing along at good speed (they said later that it was often close to seventy-five) and I was hoping a State trooper would pull them over; it would have been fun to hover a few feet above them while he was bawling them out or giving them a ticket. No trooper showed up, however, so I had to content myself with flitting

ahead to each cross-road to make sure there was no converging traffic to cause danger—then signalling them to proceed without worry at the intersection.

As we approached Batavia, the sky to the west became darker, and an occasional streak of lightning sliced down through the black curtain a few miles away. I edged northerly for a time to see if I could get around the storm, but it was spreading out and cutting off my path. It looked pretty good to the south but I hesitated to get too far off course, particularly since I didn't know what sort of conditions prevailed behind the storm front. I finally decided to land and sit it out.

The car with its yellow dot had gotten itself misplaced somewhere in Batavia's traffic and I wasn't sure which of two parallel roads it would follow toward Buffalo. So I leisurely swung back and forth between the two roads, trying to spot my companions, keeping a weather-eye on the progress of the storm in the meantime, and picking out a likely-looking house with a telephone (I could see the lead-in lines from the road) where I could land and report my position. (With this aircraft the size of the available landing field or its surface conditions had no influence on where to land, the only factors being a comfortable house and a telephone.)

I failed to pick up the yellow dot on the highway. (They claimed I flew directly over them several times), and after five or ten minutes the storm was getting too close for comfort. I swung in, then, slowly over the predetermined spot—a nice green strip of grass about 75 feet wide between two ploughed gardens—near an old farm house.

As I came to a stop 25 feet above the green turf, the lack of power which was this particular craft's weak point became all too apparent. The "bottom" seemed to drop out of it, and in spite of all I could do the ship settled rapidly to earth. Future ships will have an excess of power to cope with such unfavorable conditions as the calm, humid air before a thunderstorm, but I spent a few uncomfortable seconds wondering about the safety of this experimental baby. (Bear in mind that the pilot's safety was never in jeopardy, because of the ship's unique ability to fly as slowly as desired and to land vertically in any small spot.) A quick check of the ship showed it to be unscathed by its experience. The occupants of the houses appeared relieved to see signs of human life around the aircraft. They were only too glad to let me use their phone.

When the weather cleared and I was preparing to leave again, one of the farmers warned me quite persistently of a hidden ditch about 200 feet from the ship. I couldn't make him believe that I would take off straight up, so I finally quieted his fears by assuring him, with thanks, that I would be careful.

Another storm was skirted before Buffalo, but finally the airport loomed out of the haze. An airliner was about to land as I approached the control tower, and the man in the tower could not be expected to guess that this queer contrivance would not interfere in the slightest with the airliner's landing—so he gave me the red light. A short circle of the hangars brought me back over the tower a second time, and, although the airliner was already on the runway, the tower-man realized I saw him so he flashed a green signal for landing and left it up to me. I settled in slowly over the hangars while a sea of faces gaped upward. I purposely over-shot the edge of the ramp by twenty feet—and then backed up onto it. The ground party, on hand for the landing, drifted through the crowd and heard:

"I never thought I'd live to see one back up!"

Due to a long string of thunderstorms between Buffalo and Cleveland, further flights were cancelled for the day and arrangements were made to store the ship, with armed guards standing by all night.

Next day the usual weather prevailed in the pocket below Buffalo—very smoky, hazy conditions cut visibility to less than a mile for a time—but I steered my course half by compass and half by highway because I wanted to be near the road that the ground party was following.

Once, as a towering radio mast loomed out of the murk, I became impressed with the value of an aircraft that could come to a complete stop in mid-air if necessary.

The lake shore finally came in view, and I followed it without incident to the government's intermediate field at Dunkirk. The field was still wet from the storms the night before, and the attendant was dumbfounded when I hovered about until I found a high spot near the building where there were no puddles to step into.

The transmission was no better and no worse than before, and I decided I could take one of the ground party on the next flight. A flip of the coin chose Ralph Alex, and we were soon on our way to Erie. The clouds were still quite low and nasty looking. In any other aircraft I would have been uncomfortable.

It was on this flight, in the middle of a driving rainstorm, that a helicopter passenger was carried for the first time across a State line.

Erie at last. We hovered for a while in front of the hangar before landing—but we missed the best opportunity of the trip. One of Ralph's pet tricks was to jump out of the ship while it hung a few feet off the ground. Why didn't we think to have him do it here, and then inquire the way to the gas pump? As it was, we landed and I sidled over to the pump later.

Weather forecasts were bad. The high winds, upward of thirty to thirty-five miles per hour, we were not yet prepared to face, particularly if they were headwinds as promised. So we stowed away at Erie for the night.

The next day, we took off in the face of a twenty to twenty-five mile wind, because the forecast showed the probability of worse weather to come, and we had a good chance of avoiding it if we got on to Cleveland.

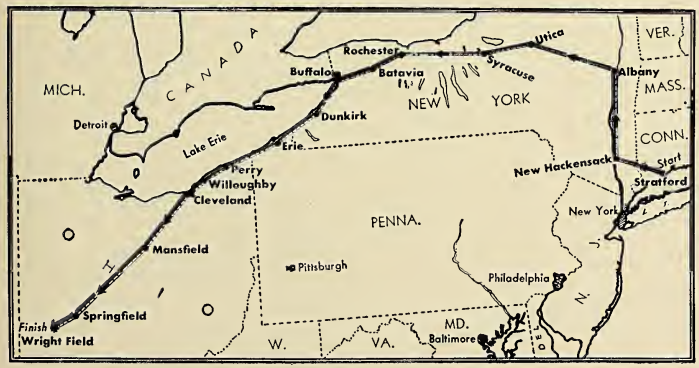
A few minutes out of Erie I realized that the transmission didn't sound the way it should, and, furthermore, I occasionally could feel through the rudder pedals a kind of catching as though small particles of matter were getting caught in the gear teeth. After a few minutes, it seemed the best policy to land and confer with the ground party.

When the ground party arrived, it was decided that Bob Labensky would make a short flight with me, and we would continue along the road until he had a chance to analyze the trouble. If it was serious, we would land again—if not, we would proceed to our next scheduled stop, Perry, Ohio.

Poor Bob. He was convinced the flight would be short, so he didn't bother to get the extra seat cushion out of the car. For one hour and twenty-five minutes he sat cramped up on a hard metal seat with the circulation cut off from both legs.

During this whole flight four ears were cocked for untoward noises—and none appeared. Analysis some time later led us to believe that the extra passenger weight was sufficient to change the loading on the transmission so that it performed satisfactorily. Actually, however, it was slowly chewing itself to pieces and had to be replaced shortly after arrival at Dayton.

This was the roughest leg of the entire trip. The wind was gusty, varying from twelve to twenty-nine miles an hour. It was



dead ahead, so I chose to fly close to the ground in order not to get into the stronger winds at higher altitudes which would slow us down considerably more. But close to the ground we got the full value of all ground "bumps." Whenever I would see a ravine ahead I would brace myself for the turbulence that was sure to be over it. Every patch of woods had its own air currents; and to the leeward of a town or village the air was extremely choppy.

Many times we would lose 75 to 100 feet of altitude in a down-gust—and we were only 300 feet above the ground most of the time. Once I watched the altimeter drop 180 of those precious 300 feet—and toward the end of the drop I began veering toward an open field, just in case it didn't stop.

But the ship behaved beautifully. It didn't pound and pitch. All it did was float up and down, and get kicked around sideways. There were no sudden shocks, and even when it yawed to one side or the other, it was not necessary to use rudder to straighten it out. Given a few seconds, it would come back by itself.

About the time Bob began to search his limbs for signs of gangrene, Perry airport came in sight, and a couple of minutes later he crumpled out of the ship, for all the world like a new-born calf just trying its legs for the first time.

No gas at Perry, but we still had enough in the tank to get to the small private field at Willoughby. One fellow said that when he saw the ship coming in, he dashed to get a movie camera from his car—but when he noticed the Army star on the fuselage, he promptly changed his mind. Such was the spirit of the flight.

Off on the last leg to Cleveland. Although the weather was a little better, this was a difficult section because I didn't want to fly over congested areas quite yet. A long sweeping circuit to the south carried me over the outskirts, but I had to use caution to keep from getting stuck in a bottle-neck of houses. Only once did I have a few uneasy moments when I had to follow a dual highway between two close-packed communities, where a forced landing, even on the highway might involve in trees and telephone wires.

But at last the Cleveland airport loomed ahead. Somewhere down there Mr. Sikorsky would be waiting. An airliner preceded me into the field, and I realized when I saw the green light from the control tower that they expected me to follow him in and land on the runway. But that was not the way of this craft; if I had landed out in the middle of the field, I would have had to take off again to get in to the hangars. My procedure was to fly down the hangar line until I discovered the one where storage had been arranged, and then land on the ramp in front of it.

As I meandered along in front of the hangars, fifty feet in the air, the green light still followed me. I could almost hear the fellow in the tower saying, "Get that——thing down!" He held the light until I got close to the tower, then finally gave up. I hovered momentarily out in front of him, grinning to see what he would do. He was scratching his head—reached for the light again — thought better of it — and finally with both hands signalled me vigorously "down."

I laughed and continued my perambulations. In front of one hangar there appeared to be more commotion than usual, so I headed that way. There was our crowd —Plenefisch and Walsh, the hangar crew—and there, apart from the rest, stood Mr. Sikorsky. He waved happily, and beamed with a broad, almost childish smile. A space had been cleared between the ships parked on the ramp, and I settled easily into it.

The weatherman hadn't been very hopeful about the weather from Cleveland to Dayton, but it turned out to be a beautiful, warm Sunday morning with a gentle breeze and high puffs of clouds.

Mr. Sikorsky was to join me on the flight from Cleveland to Mansfield. We didn't want to have him repeat Bob's discomfort of the previous day, so we gave him a cushion.

After the take-off we hovered for a minute or two in front of the hangar, then turned and started south while the ground party in the car was still getting under way. When we were set on the course, I turned the controls over to Mr. Sikorsky.

It seemed strange for me to be telling Mr. Sikorsky anything about flying a helicopter, since he had made all the early flights with the original experimental model, and as a matter of fact, had taught me to fly it. The answer, of course, was that he had been too busy to spend much time at the controls of this later model.

He had only handled them for two or three minutes during one flight at the plant, but he quickly caught the feel of it—and from there to Mansfield I was simply the navigator.

Since he had never landed this ship, he handed the controls back to me as we approached Mansfield airport. We landed close to the other ships and he stepped out.

After a moment, he walked back to me. "Les, how are you going to get the ship over to the gas pump?" I looked at the solid line of airplanes deployed between our craft and the pump.

"Well," I said, "if you will ask them to have someone hold the wings of the other ships, I'll fly over."

The clear space around the pump was about 75 feet square, and a quick jump was all that was necessary.

I took off alone for Springfield. It was the longest flight of the trip, 92 miles airline. The day was quite warm, and we were still not too sure of what was going on inside the transmission so we thought it best to have the ship as light as possible.

The miles slipped by uneventfully, and in due course the Springfield airport was below me. A small training ship had just landed as I came in over the edge of the field, and he began to taxi toward the hangar at the far end, unaware of my presence. So I slowed down and kept just behind him about five feet high as he bounced slowly along. When he reached the ramp, he turned to line up with the other ships and I saw him suddenly slam on his brakes and stop dead in his tracks.

While I waited for the ground party, an Army ship circled the port. It brought Lieutenant Colonel H. F. Gregory (now Colonel), who deserves more credit than anyone else outside our own small group for the creation of this craft.

The side cowlings which had been removed from around the gear case to give better cooling on the trip were buttoned on for the dress parade to Wright Field. Colonel Gregory phoned that we would be in at 3:40. The engine was started, and Mr. Sikorsky again took his seat alongside me.

Off we hopped, with Colonel Gregory not far behind in the Army ship, and Bob Labensky just behind him in a ship hurriedly chartered at the airport (for which the pilot wouldn't accept compensation).

In fifteen minutes Patterson Field was below us, and as we looked over the top of a low hill, Wright Field came into view.

"There it is, Les," shouted Mr. Sikorsky. His face twitched just a little and we exchanged another warm handshake.

A couple of minutes later we were circling the buildings. I couldn't resist the temptation to zoom low over the ramp, just to show that we had arrived. Then we circled back and hovered in the space that had been cleared for us a few feet in front of the operations office. Mr. Sikorsky waved joyfully to the sizeable welcoming group that had gathered.

The landing was made on a red-topped gasoline pit surrounded by airplanes of every description, from the mammoth B-19 bomber to the tiny little private airplanes that were being considered for various military missions, and Mr. Sikorsky stepped out, proud and happy at the successful completion of an epochal mission. ☆

ANSWERS

to Quiz on Page 26

1. (a) 570 miles
2. (c) Two inline air-cooled engines
3. (d) Intense cold front accompanied by storms
4. (a) Gear up and no flaps
5. (c) Phoenix, Arizona
6. (c) Lieutenant Colonel
7. (c) Revolutions-per-minute of the engine
8. (a) Wellington
9. (c) Two seat, two engine fighter
10. (a) Photographic plane
11. (b) False
12. (b) False. Casablanca is in French Morocco
13. (c) Fireworks
14. (c) "Remember Pearl Harbor" from "Remember the Maine"
15. (a) One degree of longitude.
16. (c) $100 for officers; $50 for enlisted men
17. (a) To fly low over the field
18. (c) Marauder
19. (a) QQZ
20. (b) 2,000 pounds

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GET IN SHAPE - STAY IN SHAPE!

Your LIFE May Depend On Your Physical Condition


DANGER!
BE CAREFUL WHAT YOU SAY!
GHI
DEF
ABC
JKL
MNO
ARMY AIR BASE
STA·6
PRS
TUV
WXY
OPERATOR
BE CAREFUL TO WHOM YOU SAY IT!
THINK BEFORE YOU TALK!

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

APRIL 1943

Vol. 26 No. 4

APRIL 1943

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AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

April Brief

A NEW DEPARTMENT, known as Training Aids, makes its initial appearance in AIR FORCE on Page 34 of this issue. It is a feature of the Training Aids Directorate (called TAD) of the Army Air Forces School of Applied Tactics at Orlando, Florida. All material for this department is prepared by the directorate.

The term "training aids" includes literature, training films, film strips, training posters, visual instruction material, recognition material and synthetic devices. You can get the whole story by reading the article "Streamlining AAF Training" in this month's department.

The important subject of aircraft recognition is discussed in the department's other leading article (Page 36), which explains the standardized system of teaching recognition (including recognition of surface craft and ground vehicles) recently approved for the Army Air Forces.

We are planning to introduce additional continuing features, sponsored and prepared by other units of the Air Forces, in subsequent issues of this service journal. Meanwhile, you may have more suggestions. If so, send them in.

P-38S are by now old favorites in the Southwest Pacific area. But there's a first for everything, and in this issue we are happy to document the 38s' first combat action in that theater.

Our coverage on the subject came about in this manner: Lieut. General George C. Kenney, commanding general of the Allied Air Forces in the Southwest Pacific area, sent a personal letter to General Arnold enclosing the reports of P-38 pilots who took on about 30 to 35 Jap fighters and bombers in their first time at bat.

You can see for yourself how the 38 boys made out by reading several of the reports, written a few minutes after landing, which appear on Page 4.

Just a hint of the results: "Right now the morale in that squadron is so high it almost scares you," wrote General Kenney to the Commanding General. Excerpts from his letter are printed along with the pilots' reports.

AIR DEFENSE of the United States brings into play the all-important but little-understood Aircraft Warning Service of the Army Air Forces. In an article on Page 15, Brig. General Gordon P. Saville, Director of Air Defense, tells about the inside workings of that unit. In explanation, General Saville presumes a mythical air attack on the Pacific Coast and describes the play by play behind-the-scenes action that takes place from the time enemy aircraft are first detected to the time our own fighter planes are guided by ground personnel to intercept the invaders.

ANTISUBMARINE WARFARE is generally recognized as a top priority problem of the allied nations. Two articles in this issue discuss the role of the Army Air Forces in combating the U-boat. The first, on Page 6, explains the functions and operations of the Army Air Forces Antisubmarine Command. It is written by Lieut. Colonel Clinton A. Burrows, assistant chief of staff, A-2, for the Command. In the second article, on Page 7, Captain Charles D. Frazer of the AIR FORCE staff describes a night mission hunting subs in a B-18 over the Caribbean.

AFTER BAILING OUT of a shot-up, gasless P-40, Lieutenant Clarence E. Sanford swam three miles and landed exhausted on a barren desert island off the northern tip of Australia. His equipment: one religious medallion, one ring, one pair of shorts.

The pilot's fight for survival on that small island is described on Page 10 in an article prepared by the Arctic, Desert and Tropic Information Center of Eglin Field, Florida. In addition, experts attached to the Information Center have analyzed the experience from the standpoint of solving the problems which confronted the pilot.

Lieutenant Sanford states today that if he had known then what he knows now much of his suffering, including eleven weeks in Australian hospitals after his rescue, could have been avoided. That's why we think this type of article pretty important for airmen.

"CALLING DOCTOR KILDARE!" has become something of a password, so we thought it worth mentioning that the author of "Flying in the Cellar," on Page 12, wrote most of the original articles and supplied most of the research for the Doctor Kildare movie series during the last two years. He is Lieutenant Lawrence P. Bachmann, now attached to the Training Aids Directorate at the School of Applied Tactics, who started out to be a psychiatrist and landed in the motion picture business. In this issue Lieutenant Bachmann discusses what the Air Forces is doing to test your ability to take high altitude.

THE FRONT COVER picture this month is the work of Corporal Harry W. Lemmon of the photographic laboratory, Blackland Army Flying School, Waco, Texas.

AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

FORMERLY THE AIR FORCES NEWS LETTER

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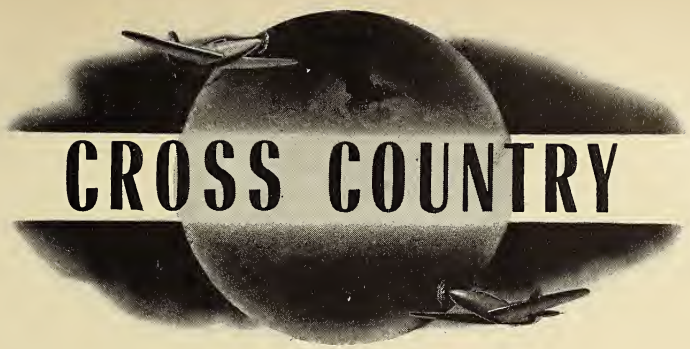

THE ARMY AIR FORCES got its fourth star last month.

Number Four went on the shoulders of the Old Man, and it shone all down the line—like wings on a new cadet.

Of course, to the thousands who have come into the Air Forces in these last busy months, he's always been The General. But to more than a few old timers he's still plain "Hap." To all of us he's the man who grew up with Army aviation and played a strong personal role in its development.

In the last year General Arnold has flown some 85,000 miles to keep in touch with his spreading organization. And we don't expect the weight of a fourth star to hold him down. We have a hunch those four stars will continue to show up on the flight line—whether it be in Texas, Tunisia or Tulagi.

In announcing the General's promotion the War Department commented:

"The growth of the Air Forces toward a strength of 1,500,000 officers and men, the responsibilities of General Arnold for the maintenance of our air forces fighting in many theatres and his position as a member of the United States Joint Chiefs of Staff made General Arnold's promotion necessary from a command standpoint and also as a recognition of outstanding accomplishments."

Officers and men of the Air Forces will go along with that. And we'll go further. We honor it as a reward for able, inspiring leadership, and as a symbol of the position air power holds in the military future of our country. And, with due modesty, each one of us—from C.O. to rawest recruit—feels as if he had received a personal pat on the back.

New Cadet Training Program

THE new aviation cadet procurement program includes several important changes in procedure for Air Forces enlisted men desiring to qualify for air crew cadet training.

In the first place, the more stringent Form 64 physical examination will replace the modified version of the Form 63 test formerly used. This means that the enlisted applicant will have to pass the tougher examination before being transferred from his present unit.

Then, too, except for a small percentage of applicants who are exceptionally well qualified from an educational standpoint, most of the successful enlisted applicants will be sent to one of a number of selected colleges throughout the country for "pre-aviation cadet training". This training will consist of 60 hours credit in each of five academic courses: modern history, English, geography and mathematics (through trigonometry), and 180 hours of physics. Additional courses will cover drill, military discipline, customs of the service, and physical education.

A third feature of the new plan, which differs somewhat from the old Air Forces system, is the increased responsibility of the company or organization commander to effect the release and transfer of enlisted men. Here, briefly, is the new procedure:

The enlisted man obtains a birth certificate and three letters of recommendation and asks his company commander for Application Form No. 60. (C.O.'s have been directed to have these forms available at all times.)

The completed application, the birth certificate and the letters of recommendation are turned over to the company commander, who then has the authority to indorse or reject the application. (Under the new regulations, rejection should not be forthcoming without due cause.)

With the necessary indorsement, plus the application, birth certificate and letters, the enlisted man is directed to the nearest cadet examining board for the aptitude test.

If he passes this test, the applicant is advised of the nearest physical examining board which he must visit for the Form 64 examination. He then returns to his company commander.

Within a few days the physical examination forms are forwarded to the original board. If the applicant has passed the physical, this board sends the necessary papers, with a request for transfer to pre-aviation cadet training, to the Commanding General of the Service Command in which the applicant is stationed.

Changes in Aviation Cadet qualifications for enlisted men; other developments of the month within the Army Air Forces.

The Commanding General then will issue the necessary orders to effect the transfer; the applicant's papers will be forwarded to his organization commander. The latter will attach the papers to the soldier's service record, make other routine entries and turn the records over to the applicant, who by this time is under orders to be transferred for his new training.

Enlisted men in other arms and services of the Army of the United States also are eligible to apply for air crew cadet training under the new program. They should follow the same procedure outlined above.

Aircraft Warning Service

WE may not all appreciate the fact that one of the Air Forces most important units is made up of some 1,500,000 civilian volunteers, attached to our Fighter Commands.

These volunteers are the backbone of our Aircraft Warning Service. Almost all of them serve as ground observers (they object to "aircraft spotters") in the Ground Observer Corps.

General Arnold recently stated: "The service rendered by ground observers in our system of national defense is frequently misunderstood and generally underestimated. They must all realize that their part is a *vital* one in the national defense."

Now and then an Air Forces unit gets an opportunity to appreciate in full the role being played by our ground observers. This was the case recently when ground observers saved a flight of nine fighter planes lost in bad weather over an isolated section of the Allegheny Mountains. *(Continued)*

Peculiar atmospheric conditions prevented the flight from maintaining radio contact with base. The flight could receive messages but couldn't send any. Ground observers in the area didn't know that, of course. All they knew was that planes were circling overhead. But continued and accurate reporting by several observers, whose reports were flashed back to an information center and charted on an operations board, led to only one conclusion: the planes were lost; something was wrong with their radio.

In the hope that the ships might still be able to receive messages, a controller at the information center radioed position on the pre-arranged frequency for that flight and gave instructions on how to proceed. Almost out of gas, the planes immediately straightened out their course. Shortly after, they all landed safely.

For the ground observers it was all in a day's work—the type of work being done on a 24-hour schedule at thousands of observation posts throughout the country. And sometimes the work is carried on despite hell and high snow. For example:

After heavy snow had made it impossible to commute to the Live Oak Mountain observation post in Oregon's Camas Valley, it looked very much as if the post would have to be abandoned. The ground observers held a meeting to find out.

"Not if I can help it," shouted a wiry little middle-aged woman. "If Jane will come with me, we'll go up there and live until the roads are clear again." Next day

the two women left with winter supplies to dig in at the lonely mountain shack. For 72 long days and nights they kept around-the-clock duty.

In all this time, not one plane flew over the post. Yet, this negative information, reported regularly by the two women, was just as important to the Air Forces as if there had been a flight every hour. That's a hint of the intricate mechanism behind our Aircraft Warning Service.

Insignia for Instructors

Gold wings sleeve insignia have been authorized for wear by flying instructors of the Army Air Forces during the time they are assigned to such duty. An instructor who has satisfactorily performed a total of six months' duty as flight instructor will be authorized to wear the insignia permanently. The gold wings, embroidered in silk, are two inches from tip to tip, of the same design as the Air Forces insignia, omitting the propeller.

The insignia will be worn on the middle line of the outside half of the right sleeve of the service coat, four inches from the end of the sleeve.

Tenth Air Force

At bases in India and China, thousands of miles from its birthplace at Patterson Field, Ohio, the Tenth Air Force on February 12 celebrated its first birthday.

We have just received a summary of the Tenth's activities during its first twelve months, as it was presented that day by Brigadier General Clayton Bissell, commanding.

The Tenth is described as a melting pot of air personnel, with men of the basic organization and those who have since joined it from the States, fighting alongside men

who, before joining the Tenth, faced the enemy in the Philippines, Java and Australia, and in China with the American Volunteer Group, and men who were the first to bomb Tokyo.

As members of the Tenth Air Force, the summary reported, they achieved at least 165 confirmed victories in the air (presumably as of early February—Ed.), or an average of seven enemy planes destroyed for each one of their own lost. This included the destruction of many Jap bombers, against only three lost by the Tenth, according to the summary. Disregarding bomber losses, the score in China stands at eight victories over the enemy for each plane lost by the Tenth. Also reported was the destruction "of at least eight enemy planes on the ground for each tactical plane we have lost."

About bomber operations: "From our principal bases in India to our most routine targets exceeds the distance from British bases to Berlin. And again, we may enter modestly a claim unrivaled by any other combatant air force in any other theater. Our raids against enemy objectives in Bangkok, Thailand, represent the greatest distance flown from base to target by any bomber formation thus far in the war, in any theater at any time. For missions flown we believe we stand incomparable for the shipping losses we have inflicted on the enemy."

General Bissell called establishment of the air link to China over the Burma Road "one of the proudest chapters of the Tenth Air Force," explaining: "The operation of the India-China transport line is no longer a responsibility of the Tenth Air Force. Our present task is merely to protect it, but let it not be forgotten that the Tenth Air Force inaugurated that service, protected it from interruption, and for the best part of 1942 kept it operating through the monsoon and severe icing conditions which came with cold weather. That feat played a vital role in keeping China effectively in the war."

On the humanitarian side: "In our earliest days, when our serviceable equipment could be counted on the fingers of one hand, we answered an emergency call by our major ally in this theater for help by flying into Burma a battalion of fully-equipped troops. Returning, we rescued from the enemy over 400 women and children in combat bombers turned into transports. A few weeks later our new ferry command devoted its planes to a similar service, bringing out from northern Burma bases more than 3,600 refugees, plus more than 600 wounded Allied ground fighters . . . When Burma fell, large numbers of our Chinese allies were stranded in the jungle canyons in upper Burma. For weeks and months that brave band of allies, never giving up, were fed by Tenth Air Force planes, which literally reenacted the parable of the ravens feeding Elijah. Until they could find a way out of the mountains into Burma weeks later, food and medical supplies dropped by Tenth Air Force planes gave them strength to fight their way out, to face our common enemy once more in the future."

Legion of Merit

A new decoration, the Legion of Merit, is being awarded to members of the armed forces who, after September 8, 1939, shall have distinguished themselves by "exceptionally meritorious conduct in the performance of outstanding services where the service performed was not necessarily in a duty of great responsibility warranting the award of the Distinguished Service Medal."

Mosquito Patrol

With malaria a Number One health threat in the Caribbean area, a mosquito patrol has been established at Losey Field, Puerto Rico.

A belly tank from a P-39 has been attached to the underpart of the fuselage of an O-49 and equipped with a small pro-

peller. The tank is filled with a mixture of paris green and lime. This "ammunition" is sprayed on the fields and swamps surrounding the base.

The enemy (malarial mosquito) has a normal cruising range of about four miles, but with a tailwind he can fly twelve miles or more. So the patrol has to be quite extensive, especially in the direction of the prevailing winds.

We are told that the patrol is raising quite a bit of hell with the malarial mosquito pilots.

Bombardier-Navigator

The "bombardier-navigator" officer makes his appearance under a new training program for the Air Forces. Full training courses at both bombardier and navigator schools, plus five weeks of aerial gunnery, will hatch a large number of these combina-

tion crewmen who will be appointed flight officers or commissioned second lieutenants at the end of the first phase of their training. Those appointed flight officers will be commissioned second lieutenants upon successful completion of the second phase.

No economizing of personnel is involved. Under present plans, for instance, many heavy bombers now carrying both a bombardier and navigator will carry two combination bombardier-navigator officers. Object: to enable one officer to relieve the other in the event of fatigue or casualty on missions. Exception: navigators trained for the Air Transport Command.

You may be wondering what happens if, for instance, a student who has successfully completed his bombardier training subsequently washes out in navigation. The answer: he retains his status as bombardier.

Among My Souvenirs

During a recent broadcast of a War Department radio program short-waved to troops overseas, the announcer asked his front line audience to "tear off the top of a Jap Zero or German Stuka and send it in

with your request for musical numbers". It was meant just as a gag, of course, but the answers were exceptionally realistic.

From a lieutenant in the Southwest Pacific, with a request for "Concerto for a Trumpet" by Harry James' orchestra, came the tail piece of a Zero. And from two sergeants in North Africa who wanted "Somebody Else's Moon" and "Star Dust", came a rather bulky package with this note scribbled on the contents: "Regret Stukas and Zeros not available. Will this small piece of wing covering from a German troop carrying glider do just as well? If it isn't sufficient we will send a couple of Jerries."

Retribution

A ferrying crew was flying a medium bomber south from the States. Since the beginning of the trip, the pilot's life had been one headache after another. The plane seemed to be a jinx job. There had been engine trouble, lay-overs, bad weather, bad landings, and what have you.

As they approached a Transport Command field in the Caribbean, it happened again. The wheels wouldn't come down. The pilot flew around and around trying to dump the gear, but no luck. Finally he gave up and came in for a belly landing.

The bomber slithered along the ground. Then, the final straw. The plane caught fire. Flames and smoke enveloped it.

A crash truck, streaking to the rescue, found the crew had cleared the ship without injury. The crew members huddled around watching the fire. All except the pilot. He stood apart from the rest. With a vengeful look on his face, he was busy throwing rocks at the burning ship.

Delayed Action

Crewmen of a B-17 had a surprise recently while flying over a quiet sector of England when a 20 mm. shell exploded in the left horizontal stabilizer. They had reason to be surprised. There wasn't an enemy plane in sight.

After the big bomber had landed, Captain Henry J. Schmidt, an engineering officer with the Eighth Air Force, began investigating. He found that the B-17 had been carrying the shell around ever since it had attacked German installations in France some three weeks before. During that attack the shell had pierced the stabilizer without exploding. The hole it made was subsequently repaired, but without knowledge on anyone's part that the missile was still in the ship.

Notes on Leadership

- ★ Keep your mind open to new ideas.
- ★ Delay action when you are mad; don't hold grievances.
- ★ Obey orders without quibbling.
- ★ When you give orders, see that they are obeyed.
- ★ Get all you can out of your troops; get all you can for your troops.
- ★ Use velvet gloves on an iron hand; make each man believe he is the best.
- ★ Use only enough punishment to assure an offense won't be repeated.
- ★ Give loyalty to superiors; expect loyalty from juniors.
- ★ Remember, sins of omission are greater than sins of commission.
- ★ Give credit where credit is due. Don't grab credit for yourself. If your organization is good you will get credit for what your men do.
- ★ If you want to know about a man, ask his contemporaries.
- ★ Try a man by court martial only if you have to, then push it hard.
- ★ Set forth clearly the responsibility of every man.
- ★ Be positive, but don't bluff or threaten.
- ★ Know your men personally as far as possible, but don't enter factions.
- ★ Make each man in your organization feel that you are his best friend—because you are.
- ★ Give your own punishment; don't delegate it to staff officers, but insist on your subordinate commanders doing likewise.
- ★ Ride maintenance and pilotage.
- ★ Have an understudy for every job. Turn all jobs over to others and leave yourself free to supervise and inspect.
- ★ Assume that an officer does his duty but inspect, and then inspect again. See for yourself. Have an inspector on your staff. Insist on all your people making constant inspections.

Combat Flight Patch

A rectangular patch of ultramarine blue cloth or other suitable material has been authorized as a background for the aviation badge to identify Air Forces personnel outside continental United States who are currently assigned to combat flight duty in a combat area. Qualified to wear the patch are personnel who hold effective aeronautical ratings or who are authorized to wear the aviation badge of air crew member. The patch is not a decoration or device designed for permanent wear on a uniform. When the individual ceases to serve on combat flight duty or when he leaves the combat area or theater to which assigned, the patch will be removed.

Bombs Away

A bombardment squadron of the 9th Air Force in the Middle East has a monkey mascot named Eta. Eta has learned how to pull the handle marked "Salvo" on the B-24s with which the squadron is equipped. Eta's possessive master, Lieutenant Kenneth G. Hebert, says she has progressed quite

rapidly in her "basic training" although she is not permitted to pull the salvo handle when the bomb racks are loaded. Incidentally, Eta's name represents a contraction of the term "Estimated Time of Arrival".

Dance Floor Orders

A reporter on The Retake, weekly publication of the Air Forces First Motion Picture Unit, is credited with a daring exploit on the home front: invasion of a hostess' dressing room at a west coast USO center and capture of a "tactical" manual for USO girls.

The Retake reports that the captured document revealed the following questions which every USO girl must ask herself before going on dance floor duty with the G.I. wolf pack:

"1. Is your hair combed, make-up fresh, seams straight, slip O. K.?

"2. How about your posture—shoulders straight, tummy in, smile contagious?

"3. Can you go more than half way without being fresh or sarcastic?

"4. Is it the uniform or the man you're helping to entertain?

"5. Can you help make the party go when things are slow?

"6. Do you realize most of the fellows have girls back home? Enjoying your company for three dances does not mean they are seeking a permanent alliance for the duration."—The Editor.

FROM A LETTER TO THE COMMANDING GENERAL—

Dear General Arnold:

As a matter of interest I am enclosing the reports of the P-38 pilots who took on a collection of about 30 to 35 fighters and bombers a couple of weeks ago. This was the first time the P-38's had ever been in combat in this theater. An analysis of these pilots' reports, written a few minutes after landing, shows 12 definite, 3 probable, 1 possible and results unobserved in 6 cases. Final returns to date confirm 15. We had 12 P-38's in the show. One of them had a forced landing at — with a shot-up engine. The airplane is repairable. The rest came home. No casualties. This batch of Japs came from New Britain and I expect that some of them in addition to the 15 never got back. The boys did pretty well for their first combat although they opened fire too far away and did entirely too much dog-fighting. They learned a lot, however, and will do better next time. Right now the morale in that squadron is so high it almost scares you. . . .

The Jap weakness and our real hope for victory is in the air. His fleet and his army can hold their own in any league but he simply cannot train airmen to compare with ours in a hurry. His original highly trained crews were superb but they are dead. His new crews cannot fly in bad weather, his night efforts are piddling and his combat skill is low. Our hurriedly trained youngsters are outflying and outshooting him at every encounter. All he has left is sheer guts. We wipe out a large percentage of his raiding squadrons but he keeps coming. . . .

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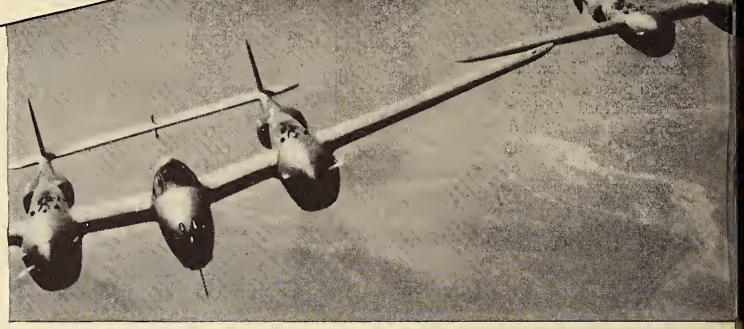

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"I SAW HIM CRASH . . ."

Arrived Buna 1200, 21,000 feet. At 1205 saw aircraft 2:00 o'clock, low. Flight went into circling dive to right. Japs were about fifteen Zeros flying in two ship elements with no particular element formation. I kept my element (second) about 500 feet above the first element and followed. As we approached Japs, my wing man passed me and joined first element. At this time, our first three ships attacked Zeros and I dove on one Zero directly below me and to my left. I fired a twenty degree deflection shot from his left near quarter at a range of 300 yards, closing to thirty yards. His engine began smoking heavily from the cowling, the smoke completely blanketing the cockpit. The aircraft went into a vertical dive off his left wing, and I saw him crash into the ocean.

I then climbed to about 11,000 feet getting snap deflection shots at three more Zeros on my way; results not certain, but I believe I got hits on one. At this time, I saw a Zero crossing me 1,000 feet below and slightly to my right. I dove on him and he pulled around to the right, passing me going in the opposite direction.

When I looked around I found five Zeros on my tail. I nosed over into a seventy degree dive and found my left engine cut. During this dive I sighted two "Val" dive bombers. The rear "Val" turned off to the right so I opened on the leading "Val" at extreme range and fired until my guns stopped. I saw my explosive bullets striking both wings and the fuselage, and pieces flew off the wings; smoke also came from the wings. The "Val" did not alter course, but went into shallow dive gradually increasing to fifty degrees. Heavy smoke was then coming from the fuselage. I did not see him strike the water.

My plane was tending to nose up and would not indicate over 175 mph., so I went to—and managed to land. My nose-wheel door was shot up and the nose-wheel would not come down and I nosed over on landing. I found one 20 mm. hole in the horizontal stabilizer just inside the left rudder, one .30 caliber machine gun hole in the leading edge of my right wing, and one .30 caliber machine gun hole through the front end of the nose-wheel door, cutting it loose, also one .30 caliber machine gun hole through the left flaps beside and behind the cockpit.

Battle Reports

from P-38 pilots in the Southwest Pacific

"Bomber blew up . . ."

Direct to Buna, arrived 1205, 21,000 feet. Wewoka called 27 Zeros. Saw seven or eight "Val" dive bombers, seven to nine Zeros (Mitsubishi). Dive bombers low, Zeros above 2,000 to 3,000 feet; dive bombers about 4,000 feet. Bombed area old Buna Strip and went down on water to northeast.

Flight dove on a Zero. I dropped my belly-tank, took pass at Zeros without firing, dove away from four Zeros which jumped my tail, taking shot at Zero on way down without result. Reversed direction in dive, took shot at one dive bomber near Buna, missed.

Turned left; out at sea at 500 feet. Saw dive bomber. Fired at range of 350 yards, long burst; dive bomber blew up, result direct hit cannon, crashed in water.

Turned toward shore. Zero passed in front of me. I fired very short burst 50 yards. Zero crashed in water.

Zeros on my tail, so I headed out to sea. Three dive bombers ahead of me; right dive bomber pulled off to right. Zeros still behind me, so took short burst at center dive bomber without observed results.

Made shallow turn to right, found one lone dive bomber, took pass; out of ammunition, went home. Combat lasted 1210 to 1218.

"A large splash . . ."

Hood Point 1140. Identified four B-26s, 5,000 feet. Four "F's" to Buna 1150, arrived —1210, 17,000 feet. Wewoka advised 26 Zeros 17,000 feet. Could not locate, climbed to 2,000 feet.

Wewoka advised two Zeros strafing——. Went down to 5,000 feet; could not locate. Climbed to 10,000 just north Buna, saw three Zeros low, dove on them from their front left quarter; Zeros turned into me, causing me to overshoot first two. Right Zero turned to right, left to left; center Zero did slow roll. Followed one which turned to his right, who continued evasive turns and rolls while diving slightly. I fired two bursts at 300 yards from his right rear quarter, and second burst entered cockpit. His plane dove into water in straight-ahead dive.

I continued my turn to right and saw one P-40 fighting one Zero. Zero broke away and turned toward Zero. P-40 and I both fired, saw bullets strike Zero, passed over it and did not sight it again, but I looked back and saw a large splash in the water.

I continued inland above and received order to return to base about 1250, landed 1315. Combat from 1220 to 1230. I did not see any Zeros fire at all.

"Burst into flames . . ."

Arrived——1220. Wewoka advised two Zeros strafing——. I was at 20,000 feet and due to cloud formation did not want to go down until positive no ships covering strafers. Flying under a cloud formation at 20,000 feet, chasing unidentified aircraft toward ——, we were jumped by four Zeros from the clouds. My second element turned to the left and dove. My wing man shot a Zero off my tail.

The second fleet of six Zeros jumped my tail. Number two Zero overshot and I got him as we went by. He burst into flames after a long burst, starting at 100 yards, and continuing until I had to break away to avoid collision. He crashed in the water. I saw another aircraft crash at the same time.

I continued my dive, turned to left, made a couple of turns trying to join my wing man. A Zero came across me, rolled away in front of me and down; I rolled with him, took shot but did not observe result. My second element and another aircraft chased this Zero inland with me following from 2,000 to 3,000 feet above, both ships firing. I saw an explosive shell hit in tail section. Directly after, pilot and ship went into nose-dive from 5,000 feet and crashed two miles south of ——.

There were at least 30 enemy aircraft visible during the initial contact. I do not know if they were joined by more ships later. My wing man, and my leader (second element) had become separated from us during the melee. I tried to reform the flight over—— but Lieutenant —— was only one to join me to come home.

After first burst, my right engine would not pull over 30 inches manifold pressure. Lieutenant —— and I returned 1250, landed 1315. Combat lasted from 1225 to 1240. I identified only Zeros but I believe there were Mitsubishi Zeros there. I saw no dive bombers. Aircraft had brown camouflage with silver bellies.

"No smoke, no fragments . . ."

Buna 1150, 22,000 feet. Wewoka advised two Zeros over ——. Went toward —— and saw seven aircraft low (7,000), identified as P-40s; followed above them.

I dove on flight of four "Oscars" which were off to right of main group. Observed total of 20 to 30; believe all "Oscars"; all dark brown paint, red circle both wings and fuselage, of

(Continued on Page 38)

Battle Reports from P-38

FROM A LETTER TO THE COMMANDING GENERAL —

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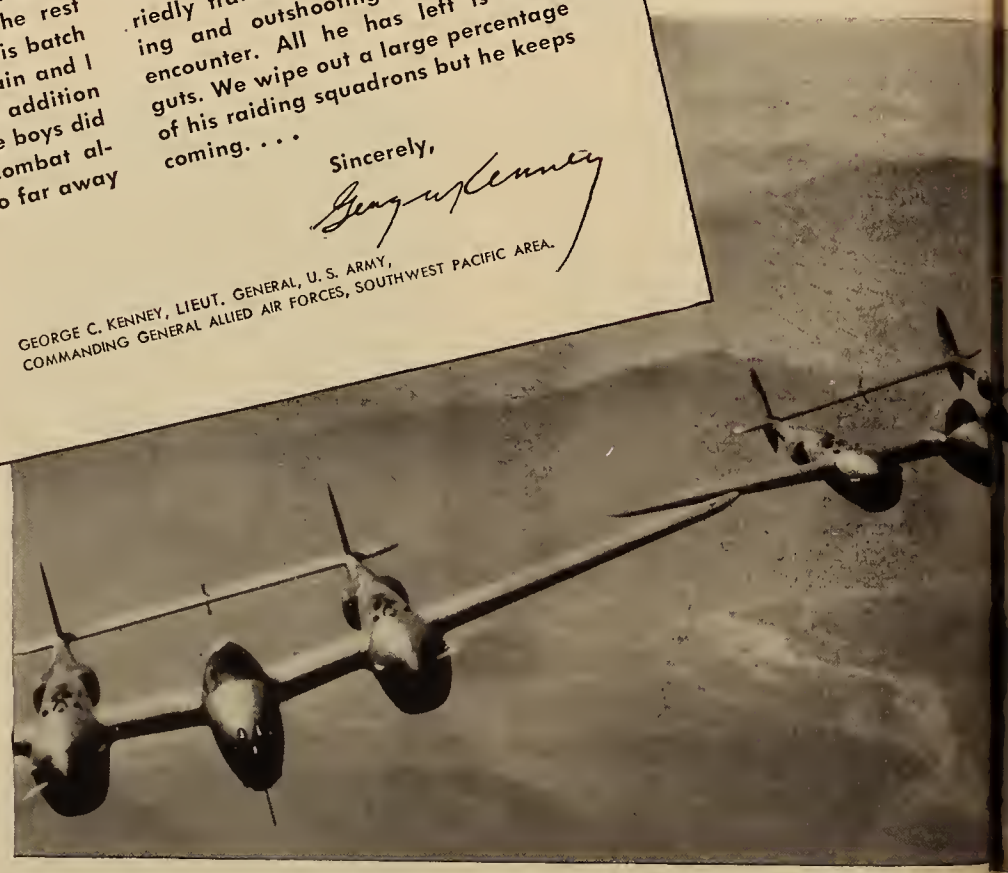

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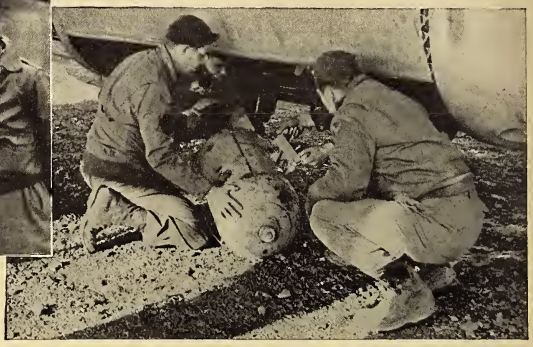
AIR FORCES

Antisub COMMAND

By Lt. Col. C. A. Burrows

ASSISTANT CHIEF OF STAFF, A-2



Brig. Gen. Westside T. Larson congratulates Captain John Shaw and his fellow crew-members of the plane "Tidewater Tillie" for sinking an Axis sub. At right, Sergts. Jack Weems, Luther Williams and Don Everhart load an anti-sub ship with a depth bomb—at an air base "somewhere in England".

A new component of the Army Air Forces organized to combat the U-boat menace.

PROMINENT in the United Nations' program to control and eliminate submarine activity is a recently announced component of the Army Air Forces—the Antisubmarine Command.

This command is the only unit of the AAF within United States continental limits having a major operational mission, or "shooting job". Its crews patrol all coastal waters and escort merchant ships hundreds of miles out into the sea. In the offensive against U-boats they are not only prime attackers but serve as the eyes and ears for American surface vessels.

Squadrons of the Antisubmarine Command also operate overseas—in any part of the world where enemy subs may be found.

Since this work calls for specialized combat crew training, the command has a school at an Eastern sea coast base and supervises all training in such warfare. Brigadier General Westside T. Larson is commanding general of the Antisubmarine Command, directly responsible to Lieutenant General Henry H. Arnold, Commanding General of the Army Air Forces.

Destroying enemy submarines from the air by land-based planes is definitely a development of this war. The job itself is not very spectacular. Tedious patrol, conducted for long hours, is the main work of antisubmarine squadrons, with occasional bursts of fast and furious action in which a plane has only 30 to 60 seconds to accomplish the sinking of a sub.

However, unspectacular though it may be, the tracking and sinking of U-boats by Army bombers has, through increased perfection of attack, become a vital factor in the combined offensive against the enemy's undersea craft.

Origin of the command dates back to the beginning of the war. On December 8, 1941, the First Bomber Command began operations with the Navy against enemy submarines off the Eastern coast. A few months later, operational control of the First Bomber Command was placed under the Navy's Eastern Sea Frontier and Gulf Sea Frontier.

IN THE four months following Pearl Harbor the I Bomber Command and Naval aircraft cooperated with ships to protect unescorted merchant vessels from submarine attacks off our Eastern coast. Finally, in April, 1942, the Navy started escorting coastal convoys, with air escorts continuing. Meanwhile, air operations continued to expand and, in October, 1942, the Antisubmarine Command was formed with the First Bomber Command as a nucleus. The new and enlarged organization was prepared to operate on a world-wide scale.

Within the Command there are a number of Wings, which, for the purpose of receiving complete intelligence and operational data, coordinate their patrol area. At present, planes of the Antisubmarine Command are coordinated with the antisubmarine operations of the Eastern Sea Frontier, the Gulf Sea Frontier and the British Coastal Command. Other wings of an enlarged Antisubmarine Command carry the fight to U-boats wherever they can be found in the world.

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Patrols in an area of more than a million square miles are directed from control rooms in New York, Miami and overseas centers. In these rooms large staffs of Army, Navy and Allied communication experts, plotters and intelligence officers receive and evaluate reports of U-boats sighted. Here controllers give the quick orders which send aircraft and naval vessels to the attack.

Sometimes messages announcing sightings prove to be duds. *(Continued on Page 28)*

THIS IS THE AR

Night Mission OVER THE CARIBBEAN

By Captain Charles D. Frazer

Hunting submarines off Latin America in a B-18 is hard, tricky, relentless work.

OUR B-18 is in a long turning dive toward the sea.

Twelve hundred feet . . . now 700 . . . 300 . . . 100. In a final rush the bomber levels off at 50 feet and hurls her bulk across the surface like a gallant old cavalry horse making a charge.

There may be a sub ahead. We don't know. Dusk has settled on the Caribbean, merging water and sky into a gray, shapeless mass.

Suddenly, the interphone crackles. It's the bombardier.

"I see something, Lieutenant, dead ahead."

The pilot steadies the ship, then shouts the order: "Bomb bay doors—open."

There's a creaking in the belly of the fuselage. And now we all can see something—something dark and indistinct and apparently motionless on the water.

Once again the bombardier cuts in. This time his voice is dead with disappointment.

"Too bad, Lieutenant. Only a schooner."

The B-18 lifts her nose, starts a climbing turn. A few stars have come out. They seem to spin round in the plexiglas ceiling of the cockpit. At a higher, safer altitude we circle and fly over the vessel, now clearly visible below. Since there's nothing suspicious about it, we resume the original course. Better luck next time; the night's still young.

This mission began, actually, at 1645 in the afternoon from the base of an Antisubmarine Command bombardment squadron attached to the Antilles Air Task Force. The base is many miles from headquarters. A few barracks, a runway, a control tower—that's about all. Hidden in thick jungle, the base is raw and rough and damp. Bugs and mosquitos are a constant diversion, malaria and dysentery a constant threat, snakes abundant and varied.

But this is a key airfield of the Caribbean Sea Frontier, which—except for part of a shipping lane to the far north—is the most active submarine area in the Atlantic Ocean. Here a Joint Army-Navy Command works ceaselessly to control the raids on vital merchant shipping.

THE crew on this night mission is made up of First Lieutenant Lionel J. Cormier, pilot; Second Lieutenant Roger T. Shaw, copilot; Second Lieutenant Peter J. Stampon, navigator; Sergeant Hal B. Page, bombardier; Corporal Ralph Bush, radio operator; and Pfc. Allen Guthrie.

After an early dinner, we assemble at 1715 in the Operations Control Room for briefing.

A blue steel board flanks one side of the room. On it is charted the position of surface ships, the probable positions of submarines, the position of both Army and Navy aircraft out on missions, and a maze of airplane courses, or tracks. These tracks are established hours ahead by Group Headquarters and transmitted to this base.

"You will fly the Nan mission."

First Lieutenant Charles Havens, S-2 of the squadron, indicates the course on the board. It is a point-to-point-and-return, first northwest, then practically due west.

"This is a preliminary sweep," Havens continues. "A convoy of ships is due into this part of our area. You will sweep it clear tonight, and Navy PBYs will provide cover until the convoy is through.

"There's a German submarine somewhere in this vicinity." He points to a far-off section of the Caribbean where it was last seen. "It's reported to be 200 feet long, with the conning tower in the middle.

"This is the only one we feel certain is in the area. Another was reported—here—by a transport plane but Headquarters has no supporting data on it.

"Two or three other subs, however, may be on their way up from the coast of South America to intercept the convoy. We know they were operating down there just a few days ago because one convoy lost some ships."

Havens hands our navigator a map and begins to give more technical instructions.

"There are no vessels patrolling your area tonight. But an American submarine is anchored off a harbor—here. Don't drop anything on that.

"As you know, French or Spanish ships

MY, DAVY JONES

AIR FORCES

Antisub COMMAND

By Lt. Col. C. A. Burrows

ASSISTANT CHIEF OF STAFF, A-2

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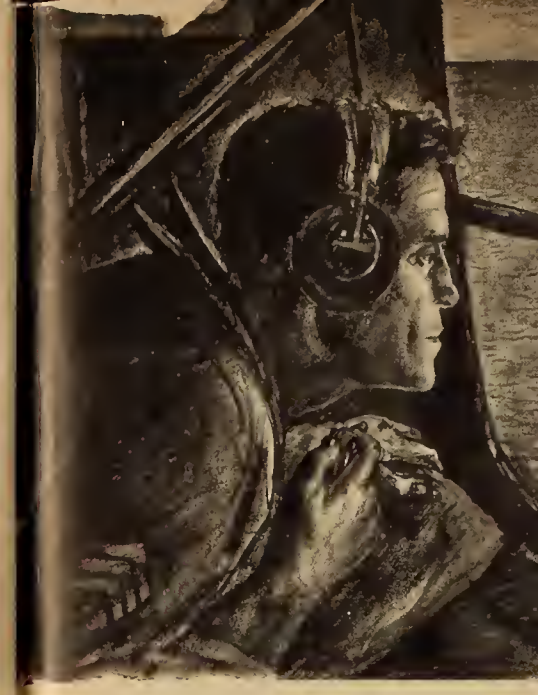

By Captain Char

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THIS IS THE ARMY, DAV

occasionally go through your area. It's particularly important to report their courses.

"The weather should be good. There are clouds over this island but the Mike mission ahead of you reports high ceiling or none at all at sea. With a full moon, your visibility should be excellent.

"Recognition signals will be good 'til eight o'clock tonight (midnight Greenwich time, by which all operations are gauged). Weather signals are good 'til one o'clock.

"Let us hear from you, of course, if anything unusual happens. Otherwise, maintain radio silence at all times. If you have to break it, break in code only."

After one or two questions by Lieutenant Cormier, the briefing is over. It is 1740. We leave the operations barrack, drive in a staff car along a road lined with tall grass to a cleared patch where our B-18 is dispersed.

Cormier, a young, heavy-set chap from New Bedford, Massachusetts, turns and grins. "I hope you're not superstitious." He nods toward the nose of the plane. Her nickname is "Friday The 13th."

Each crew member is dressed in a coverall and wears a pistol, a long knife and a canteen. If you're forced down in this jungle, it is no cinch to get out. One plane, some months ago, crashed only a few miles to the east and it took twenty days for troops to reach the spot on foot through swamp, trees, vines and bush.

Our parachutes have emergency supplies packed in the seats and the airplane itself carries equipment against a landing at sea. There are two rubber rafts containing rations and radio sets which automatically can send SOS messages. To one of the rafts is roped a five-gallon wood keg of water.

The plane is further equipped with a Tommy gun, a hatchet and a supply of smoke bombs.

These smoke bombs may be especially useful. Should we find and attack a sub, one of the bombs can be dropped to serve as a marker while we turn. Or, if we think our navigation is off, we can drop a smoke bomb and get a drift reading.

The loading for submarines consists of heavy depth charges slung in the bomb racks. One will do the business, if the hit is close enough but they carry plenty for a pattern if necessary.

Boarding the plane, Cormier says: "Remember, if we have to make a water landing for any reason, get in the back of the ship and brace yourselves." Our Mae Wests are strapped on.

The engines are switched on, warmed awhile. Then, at a "clear" from the tower, we roll onto the road, taxi along, and finally stop at the foot of the runway. This runway is well concealed between sugar cane paddies on either side. From the ground, you couldn't see it fifty yards away.

Rev the engines now. It's 1758 and we're scheduled to be off within two minutes.

From the tower: "O.K. You're clear to Number One."

"Roger, thank you."

Heavy yet somehow graceful and responsive, our B-18 gathers speed, takes off smoothly, gains altitude, and makes an easy bank to the left.

Darkness comes quickly in the tropics. The sun is sinking red into the sea ahead and already lights are showing in native shacks behind us.

We switch our earphones from R1 to the interphone connection and a voice inquires:

"Bombardier to pilot. What does your altimeter read, Lieutenant?"

After he gets the reading, there's a pause, then:

"What's your airspeed?"

"120."

"Roger, thank you."

Leaving the jungle and sugar fields and swamp, we are out over water now, passing west of the harbor where the American submarine is anchored. Several merchant vessels are also in the harbor, and many of them obviously will not sail for awhile. Battered and damaged, some of them listing, they have been hauled in for repairs. Nazi subs are tough down here.

Barely half an hour from the base we made that first run on the schooner—and had our first disappointment. You really wouldn't expect to discover a sub so close. But there's no telling. Enemy sub commanders are audacious and tricky. They always get within 1,000 yards of their quarry and have even been known to surface in the middle of a convoy, sending out their torpedoes and shells in all directions at point-blank range.

Following that run on the schooner, we regain altitude and fly at 1,200 feet.

Stampon, the navigator, comes up from the bombardier's cabin to squint through the driftometer. Since there is virtually no wind, the copilot accuses him of looking for mermaids. Why not? Nice night for it.

The pilot glances out his window at the port engine. The exhaust flame is a bright blue. "Blue coal"—too rich a mixture. He adjusts it until the flame is the reddish-orange of a lean mixture. Down in the Caribbean, where there's a shortage of many things, you have to conserve gas.

The automatic pilot is switched on and we drone along our track, peering out the cockpit windows, scrutinizing constantly the dark gray surface below. Ahead, about fifteen degrees to the left, is a rain squall, a rather lively one. There's another further off to the right. They can nearly always be seen in this climate.

Presently the pilot's gaze fixes on the north. A tiny light is twinking at what appears to be horizon level.

"We'll go up and take a look."

The bomber turns slowly. There should be no lights, of course. Ships in this area do not carry them, nor do aircraft. Except for the instrument panel, our plane is as dark as the sky around us.

This light might be a rescue party at work or something else extraordinary. On and on we fly, but seem to get no nearer. That light's a hell of a distance away and the crew, discussing it on the interphone, decides that it must come from an island fifty miles off. This turns out to be the case. After a little, we can see the deep shadow of land.

Since this investigation has taken us some distance from our prescribed track, the navigator is busy with charts and graphs. He will plot a new course from this point.

"O.K., Lieutenant, you can change course any time now," he says, and gives us a new compass direction. Friday The 13th swings gently and heads west. We will fly for nearly two hours on this track.

Anti-submarine work by this Bombardment Group is offensive warfare. This is quite different from the defensive tactics employed elsewhere—that is, day-after-day patrol of specified areas.

Colonel Charles A. Born, commanding the group, believes that the true function of aircraft is to attack submarines before they can do any damage. His intelligence staff at headquarters closely analyzes sub operations both in and outside the area, and predicts future operations.

On the basis of known and predicted data, Colonel Born's staff—in collaboration with the Navy—schedules missions according to where subs are expected to be. Squadrons of the Group provide coverage for convoys passing through, naturally, but more often their missions are to seek, find and bomb. If and when four-engine planes become available, Colonel Born hopes to send them ranging far into the mid-Atlantic to intercept the Nazis before they can reach the Caribbean.

Headquarters of the Caribbean Sea Frontier plots its information on a master board far more complex than those at operational bases. Working in a Joint Control Room, Army and Navy officers pool their data, chart positions of all ships and aircraft in that entire section of the Atlantic.

Every reported submarine has a designation. Every attack on a vessel is charted, as is every sighting or attack on a sub, the location of wreck survivors, the location of torpedoed ships, the estimated past course of a submarine and its possible future courses.

Through such intelligence as this, the Control Room establishes complete coordination between Army and Navy aircraft, and between all aircraft and surface patrol vessels.

But submarine control remains a most difficult problem. The odds are heavily on the enemy's side.

Night air operations are effective only when the moon provides some measure of visibility. On bad nights, aircraft are confined to the actual coverage of convoys.

It is hard to hit a sub. Air attacks depend largely on surprise and generally the enemy can see you before you see him, no doubt aided by special aircraft detecting equipment. He can crash-dive in about thirty seconds, leaving only a swirl on the water. You can drop your depth charges ahead of the swirl but he may have turned right or left

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

as he dove. Rarely can you tell whether you hit him. Oil may appear on the surface; he may have shot it up himself. Debris may appear. But subs have been known to carry debris to shoot up, merely to mislead attackers. The German being what he is, it is not beyond reason to suppose that survivors have been sent up to the surface for the same reason.

Contrary to opinion, submarines do not have to come up each night to recharge their batteries (although this must be done frequently), nor do they require mother submarines. An ordinary sub can carry fuel for three months' operation, ample for voyages back and forth to the French coast.

The B-18s of the Group attack usually from about 50 feet, using no bombsight whatever or only a simple strip of adhesive tape across the nose panel.

But it is not frequent that a crew has a chance to sight and attack a U-boat. The crew of Friday The 13th had made an attack two weeks before our flight—doing certain damage yet not scoring a "kill". Since then, they hadn't even glimpsed one.

The time is 1925—we still have an hour to go in this direction.

Cormier turns the stick over to Lieutenant Shaw, copilot, and hunches through to the rear of the plane. Soon, there are sharp cracks just behind the starboard engine. A machine gun. Back there, to relieve the monotony, the pilot is practicing. As he fires at the ocean, you watch the fiery tracers as they seem to curve downward until they plink into the water.

After what seems an endless flight, the navigator announces that we have reached our destination point. It is 2030 and we're two and a half hours from the base. Friday The 13th makes a ninety-degree turn to the south.

WHILE the copilot flies, Cormier sets his face toward the moon to scan carefully every square mile of that silver water. Occasionally the sheen is broken by the shadow of a cloud but otherwise—nothing.

Soon we make another turn and are on the track home. We will cover virtually the same route. Ahead of us, the Mike mission is flying a box-like course and later missions will have still different tracks, so by morning the whole area will be chequered.

Off to our right is a flat, bald island. There's nothing on it except herds of goats. Every so often, however, a plane will make an emergency landing there. Flying low over it, shining our spotlight, we find nothing.

Below, on the water, is a slender, wavering line. Down in the bombardier's compartment, Sergeant Page explains it. "That's oil. The wake of a ship. It may stay on the surface for days or even weeks."

After many missions of this kind, he knows the habits of submarines intimately and tells about them.

"The best time to catch one is when he's refilling his torpedo tubes. He can't dive until his tubes are closed and that gives you a little bulge on him. If he's only charging batteries, he can crash-dive on you."

It has to be really fast work, then?

"Yes, *sir*. To be sure of a kill, you've got to drop a charge on him within 30 seconds after he starts to crash-dive. It has to explode within fifteen feet. Otherwise, all you get is a probable.

"And it's next to impossible to surprise a sub. They're smart, these Germans. When you see one, you got no time to lose."

Our plane has been droning on mile after mile. Suddenly Page claps a hand to his earphone, stiffens and peers eagerly ahead.

"We've got a target," he whispers.

WE do not have to be told. Friday The 13th has gone into a dive—steep and aggressive. The water rushes up at us, nearer, nearer, right into our faces, until at last the pilot pulls out and we find ourselves a bare twenty feet above the surface. Our altimeter, set at fifty feet, reads less than zero.

We have turned right toward the darkness outside the moonpath. Page pulls a switch to open the bomb bay doors, another to unlock the racks. Maybe, just maybe, we're in luck.

There—something dark on the water, directly ahead at our eye level. We're rushing toward it. The Sergeant's hand grasps a lever, ready . . .

Oh, hell.

"Another schooner, Lieutenant," Page cries into the mouthpiece.

We're still walloping along toward the schooner and the top of its masts are higher than we are. Had it been a sub, we'd have been right on the button. Nice flying.

Our plane pulls away to the right, banks and climbs, circles, returns for a closer investigation. Same old story—nothing suspicious. Disgruntled, we head for home, still an hour or so away.

Approaching an island base and a harbor, we see flares rising into the sky. It's the American submarine, taking no chance of an attack from us. Don't worry, Captain, we know about you.

Soon we're nearing our own field. The runway lights go on and we call the tower. Our radio fails just as we are about to land but that's all right. Old Friday The 13th puts her wheels down exactly at 2300.

Lieutenant Cormier and his crew will be out again tomorrow night or the following morning. Submarine control is a high priority problem, equipment is limited, and crews here are flying 100 to 120 hours a month.

Old Friday The 13th taxis back to its dispersal point. All tenseness gone, crew members kid each other like a winning football team in the shower room.

A tractor comes out to meet us, draws us backward into the "hardstand", the engines are cut and we climb out, glad for the chance to stretch.

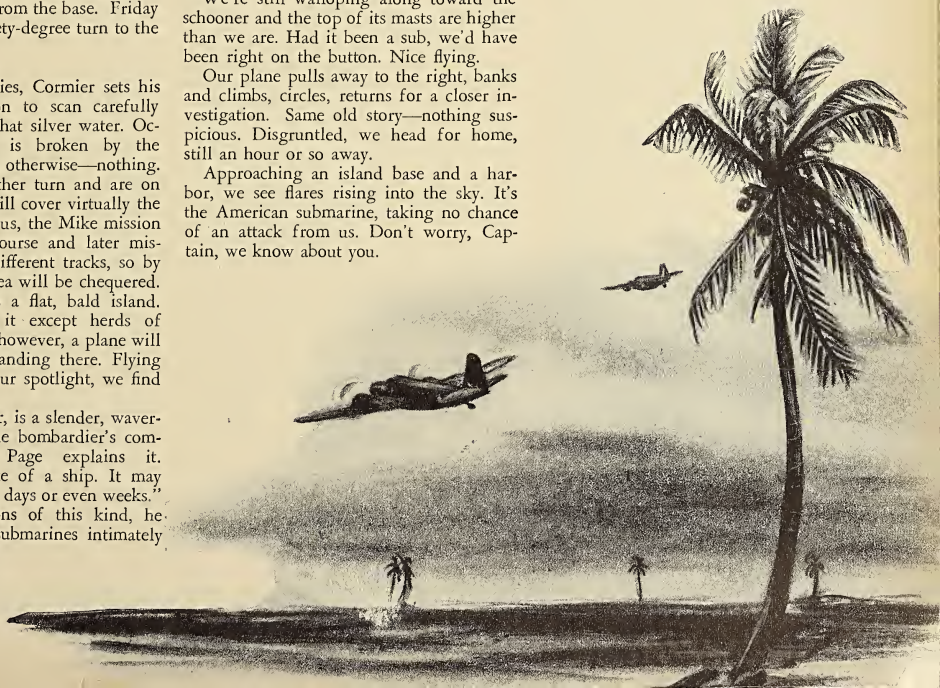
Back in Operations, Lieutenant Havens questions us about the flight and makes notes of every detail. The crew answers with the glib cheeriness of men who know they've done a job well.

"You couldn't have swept the area better with a broom."

Shaw, the copilot, grins and says, "We sorta picked your teeth with the masts of that schooner, didn't we?"

Soon the mission is completely over. We have done what we could for the convoy, perhaps kept a couple of subs down, at least. Tomorrow the PBYs will take over.

We can't go to bed yet, naturally. Everyone has to have a coke in the club and talk a while. But it breaks up around midnight. Tomorrow is another day. ☆



Bail-out OFF AUSTRALIA

There are lessons for every airman in this fighter pilot's story of survival

THIS is the story of Lieutenant Clarence E. Sanford, pilot of a fighter group operating with an advanced echelon off the northern tip of Australia.

On the fourteenth of March, 1942, Lieutenant Sanford, on an interception mission with three other American P-40s, encountered twelve Zeros and ten Jap bombers. Six Zeros were downed in the melee. Sanford, who accounted for two, chose to chase one of the bombers.

His P-40 was pretty badly shot up. The only instruments he had left were his airspeed, altimeter and compass; the canopy was gone, and Sanford himself had caught a grazing foot wound. The remaining Zeros caught him at 15,000 feet and mauled him further. He got away from them through a 1,500 foot overcast, but when he pulled back up to 9,000 feet, his wheels were down, the hydraulic system shot up, and the right wing heavy. Altogether, his P-40 was in a very decrepit state. He headed south and west, and just as his fuel gave out, he saw land.

Sanford bailed out over water at about five in the afternoon, three miles from shore, carrying only his jungle pack. He got out of his chute fifteen feet before he hit the water. To his dismay, his Mae West failed him. He got rid of it, and discarded his shirt, shoes, and sox. The jungle kit got waterlogged quickly as he swam. He discarded it as useless, salvaging only the machete. But the machete impeded his swimming. It began to weigh a ton and to assume the proportions of a fire-axe. He tried holding it between his teeth, but it cut his mouth. Finally, in desperation, he let it go, and struck out in earnest for the distant land. Luckily, the offshore tide was slack and, with the last strength remaining in him, he stumbled up on the beach and promptly fainted.

Sanford came to before dark. The prospect was bleak and terrifying. He found himself on a sandy, barren island he judged to be about five miles long and two miles wide. Frantically taking stock of the situation, he found himself appallingly defenseless. Inventory: one religious medallion, one ring, one pair of shorts and a shocked Sanford inside them. Exhaustion mercifully blotted out the prospect in sleep on the beach.

HE awoke in a blazing sun. He was hungry and thirsty. He hunted for food. He caught sight of a "dingo" (native dog) but couldn't get near it. Finally, he found some shrub roots with nodules on them. They were soft to the bite, proved edible. There were some leaves, too, which he nibbled. He found he could get water by scraping the sand some hundred yards from the shore. The water seeped up. It was brackish, but it was free from sea salt. All this time the sun blazed. Sanford estimated the temperature at well over 125°F. There was no shelter, no shade. He began to burn painfully. The symptoms of sunstroke came on. Late that afternoon, in a mental bout with fantastic colored images, he lost consciousness.

This time, he was awakened by a sensation of the presence of life near him. Three Caledon Bay headmen stood their distance, eyeing him intently. One held a spear in readiness.

"Are you Jap?" came the query from

A PERSONAL EXPERIENCE COMBAT REPORT FROM THE

the spearman, using three of his twelve words of Pidgin English. Sanford shook his head violently in the negative.

"English?"

Sanford replied: "American."

They didn't seem to understand. Sanford pointed vaguely to suggest that he came from far away. He wasn't doing too well. Suddenly, the spearman pointed to the medallion and asked: "Jesus?" Sanford nodded "Yes." There was a prolonged pow-wow among the three natives. They came closer. Sanford, lying there, scratched a rough outline of Australia in the sand and asked them in sign language to point out his position. They seemed to understand and pointed it out.

Finally they seemed to reach an agreement. They carried the helpless Sanford away from the beach, dug a hole in the sand, laid him in it, and covered him with leaves and branches. Then they brought him turtle eggs to suck, and fish which they speared ingeniously in the surf and cooked in a fire started in boy-scout wood-spindle fashion. Sanford didn't eat much. One of the eggs was bad. Finally, the natives covered him with sand as dusk fell. He couldn't sleep. He was scared. He had feverish visions of a cannibal feast. He could see the waiting pot.

In the morning, he felt stronger and started to hike with the natives to the end of the island. The hot rocks burned his bare feet. His sunburn broke into blisters. The three natives talked about a "missionary" and pointed toward the mainland. They came to a dugout canoe drawn up on the beach. There was another long pow-wow which left Sanford apprehensive. It turned out the Caledons were waiting for the tide. Finally, late in the afternoon, they set out in the canoe across five miles of water toward the mainland. They sat close to the water and schools of sharks bumped the frail craft. Sanford didn't like it at all.

They got to the mainland all right. They left the canoe on the beach and struck out along the shore on foot. Sanford got woozy again and rested. The natives brought him water. His sunburn was torturing. Open wounds began to appear. He struggled into the sea-water at intervals for temporary relief. The Caledons didn't seem to understand sunburn.

Sanford doesn't remember, but he thinks they spent the night on the beach. In the morning, they resumed the trek again. His feet were terribly swollen. The skin cracked open. Wantjuik, the spearman, removed his own loinknot, tore it into strips, and with some green bark made mocassins for Sanford's feet. That helped. They hiked on. They ate more turtle eggs and raw fish. They drank brackish water seeping up from the scraped sand.

Sanford was still apprehensive, felt he was being spared only to become cannibal bait. He armed himself with a jagged piece of coral. Wantjuik sensed his fear. He took the coral out of Sanford's hand, had another pow-wow with his buddies, and suddenly all three broke into the hymnal strains of "Don't pass me by" sung in native Kopapingo. Sanford couldn't appreciate the humor of the situation. But he began to feel reassured. Physically, he was deteriorating rapidly. His sunburn was excruciatingly painful; his tongue had begun to swell; his liver had gone bad, and the symptoms of yellow jaundice were setting in; he was feverish. When he cried out in pain the Caledons laughed aloud. They couldn't understand it.

The trek to the mission covered 50 terrible miles, alternately along the beach and back into the bush when steep cliffs intervened. Sanford gave out completely some five miles outside the mission station. Wantjuik picked him up and carried him in. One of the Caledons went ahead bringing the news. The missionary came out to meet Sanford, bringing bully beef and water. The pilot was put to bed, suffering from jaundice, fever, sunburn, and shock.

The missionary called Darwin on his pedal wireless, and did what he could for Sanford. The three natives were rewarded with tobacco and a bolt of cloth. They felt kinglike and were local heroes. Later, Sanford learned that they had seen him bail out and regarded his descent as a major miracle. They frequented Sanford's island for one or two days each six or seven months on hunting expeditions, and their presence was Sanford's great luck. They had been educated at the mission, knew a little about Australian geography, knew about the war and hated the Japs (who annoyed Caledon women on their local pearl-fishing expeditions).

After a week and a half, Sanford was transferred by mission boat 350 miles up the coast to Millingimbi, the main mission station in the region. He stayed there for five days and grew steadily worse. The missionary wirelessed to Darwin, describing his critical condition. A Hudson bomber flew out and brought Sanford back to Darwin—just in time to catch a strong Jap bombing raid. It proved almost the last straw when a bomb fell just a few yards from where Sanford lay. Finally, however, he was transported to Brisbane where he spent eleven weeks in various hospitals. Several months later, and apparently none the worse for wear, Sanford came home to the States.

His story holds a significant moral for every combat crewman. Sanford now states that if he knew when these events transpired what he knows today, much of his suffering could have been avoided. His native resourcefulness and his great good luck were the sole factors in his survival.

In examining Sanford's experience, these vital facts stand out:

1. Before you set out on a given mission, check your emergency equipment. If Sanford had checked his CO_2 bottles, his Mae West wouldn't have failed him. Also, if he had considered the possibility of bailing out over water, he would have carried a flotation-type emergency kit. If Sanford had carried a map of the region in his plane and had oriented himself during the flight, he would have had an idea of his position—an important factor in survival.

2. Stay calm when you are face-to-face with a forced landing or bail-out emergency. Weigh the factors. Don't get frantic. If you know what you're doing, you can survive even under the most discouraging circumstances.

3. Knowledge of the terrain and conditions under which you are operating is all-important. It prevents hysteria and panic. It's insurance for survival. Sanford would have been helped measurably if he had known more about the natives and their language; if he had possessed a practical working knowledge of the edible plant and animal life of the region, and if he had known how to obtain and use them. He learned the facts when he watched the Caledons. Sanford had no grasp of the terrible effect of the sun on the exposed body. He could see no way of escaping the sun once his clothing was gone. There was no shade anywhere. Yet there was a way—the natives showed him how to dig himself into the sand and to cover himself with brush. Today, Sanford declares that if he had possessed this knowledge, he would have had the utmost confidence in his ability to survive for months if necessary on his desolate island. ☆

The experience related in this article is one of the many gathered by the Arctic, Desert, and Tropic Information Center at Eglin Field, Florida. It is the function of this organization to prepare and disseminate information on all aspects of Air Force operations (maintenance, health, shelter, clothing, etc.) in non-temperate zones. Information on forced landing procedures and survival is a major interest of the Center. All Air Force units are invited to request such information from the Arctic, Desert, and Tropic Information Center.

ARCTIC, DESERT AND TROPIC INFORMATION CENTER

Flying IN THE CELLAR

By Lieut. Lawrence P. Bachmann

DIRECTORATE OF TRAINING AIDS
SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

THE other day seven of us were up to 38,000 feet for three hours.

We didn't go anywhere and didn't see anything. We didn't have to wear winter flying suits and took no parachutes along. We were on a flight in a portable decompression chamber, or, as someone described it, "We went cellar flying."

We were at 38,000 feet, all right. We were up there just as surely as any crew flying that high ever was there. If you don't believe it, try cellar flying. When you get to 38,000 feet take off your oxygen mask. Chances are you'll remain conscious just fifteen seconds.

Flying in the basement is not being done to amuse or keep busy the scientists and research men. There is a definite tactical reason why every man on flying status must be tested for his ability to take high altitudes.

Everyone knows the advantages of an airplane with high ceiling. We know how high our planes can go. We have tested them. But we don't know how high the men who fly the planes can go. And that is what we are finding out.

It would not only be stupid, but criminal to send a man to 38,000 feet without knowing whether he could stand such a height. We can provide him with the best oxygen equipment available and everything else. But that is not enough. The final answer lies in the man himself, in his body—can he take high altitude?

THERE are several large decompression chambers at centrally located places, but valuable training time would be lost if men had to travel to and from these points.

Portable decompression chambers were developed several years ago. At this moment trucks pulling trailers which resemble a cross between a small gasoline tank and a cement mixer are rolling up to our airfields all over the world to test flying personnel for high altitude work.

Let's do some basement flying. It is dark outside when we report to the officer in charge of the chamber. We fill out cards, leaving blank the space provided for symptoms until the end of the flight. Then we are carefully fitted with oxygen masks.

"Just cover the end of the hose connection with your hand," advises the officer. "Breathe in. If the mask has no leaks, it will collapse around the sides of your face."

The outside door of the chamber swings open heavily and silently, like the entrance to a bank vault. Seven men come out. Their oxygen masks are taken from them by other members of the crew. The masks will be sterilized for the next group.

"All right. You're up now," says the officer. "Lieutenant Smith is going with you. He is your flight officer."

Lieutenant Smith grins and leads the way. He's built like a football coach's dream of an All-American guard.

Starting up the steps, we have to shout loudly through the mask to make him hear.

"No, we don't stop running the cham-

ber," the lieutenant replies to a question. "It goes twenty-four hours a day except when we're traveling to the next field."

We enter a small anteroom or chamber large enough for two people. Then through another open door and into the large working chamber. It is about ten feet long, seven feet wide, and six feet, two inches high. Two benches run along the length, facing each other. Above the benches, attached to the wall, are the oxygen lines with outlets and regulators.

"Take any seat," says Lieutenant Smith. "Three on each side. Hook the hose connection into an outlet and you're all set."

THE flight officer sits perpendicular to the two long benches, facing the door. Now he puts on his mask and tests the microphone. He is the only one equipped to talk to the outside. Conversation is carried on through a loud-speaker system.

There is a heavy thud and a metallic clang. The door is shut. From the distance the sounds are repeated. The other door between the lock and the outside is closed.

"Are you all ready, sir?" The voice is metallic and hollow through the loud-speaker.

The flight officer looks at the six of us. We nod in turn. Nothing can be heard but the slight suction of the regulator each time we inhale.

"Take her up!"

"Three thousand feet, sir—6,000 feet—9,000 feet—." The voice drones every minute.

We sit on the benches facing each other, saying nothing.

"Thirty-eight thousand feet, sir. We're leveling off. Everything okay?"

Again Lieutenant Smith looks questioningly at the six of us.

"Everything's all right. Keep us at 38,000 feet. We'll be here three hours. You might as well make yourselves comfortable."

This last is for us. It's getting warm. I take off my shirt and open a magazine and begin to read. It's a pretty good murder mystery. Imagine reading a murder mystery at 38,000 feet, wearing an undershirt!

"That second man on your right, sir!"

My head snaps up. The voice over the loud speaker is urgent.

"Are you all right?"

The tall man on my right with hair the color of straw points to his knee. Quickly a pad and pencil are passed to him. He writes. I watch the marks on the page turn into words.

"My knee is beginning to hurt. I'll be all right," it reads.

It is passed on to the flight officer.

"Better be sure," he says. "You've got bends. Sometimes the pain increases very quickly."

The man shrugs. His nose and mouth are covered but there is no reason for him to speak. His blue eyes are expressive above the gray of the oxygen mask.

"Don't take any chances," the flight officer says. "It's nothing against you if you develop bends at this altitude. We'll take you down. Just be thankful you learned you were susceptible to bends here, in a decompression chamber, instead of at 38,000 feet when you were flying a mission and altitude was your protection from the enemy."

A mission may depend on your ability to take high altitude. Here's how that ability is tested.

The pages of my magazine flutter unheeded. We are all watching. Beads of sweat are coming to the blonde man's forehead.

"Shall we take you down, sir, to 27,000 and get him out through the lock?"

The face of the chief operator peers through the heavy glass of the porthole like an anxious fish in an aquarium.

"Take us down!"

The blonde boy shakes his head but there is relief in his eyes.

"Keep swallowing," the flight officer says. "Swallowing will equalize the pressure in your inner ear as the altitude changes."

I swallow. The hiss of air entering the chamber gets dimmer. It feels as if someone is stuffing invisible cotton into my ears. I swallow again. The cotton is gone. The sounds are no longer muffled.

"Twenty-eight thousand feet, sir," says the voice from outside.

There is a hollow ring of steel against steel. The heavy door directly opposite the flight officer slowly swings open. The lock man comes in. A long tube connects his oxygen mask with the regulator in the lock.

"Take the walk-around bottle," says the flight officer.

The small fat cylinder is passed to the man next to me. It is surprisingly light.

"There's enough oxygen in it for eight to ten minutes. Take a deep breath. Hold it!"

The lock man separates the hose of the mask from the regulator and connects it to the walk-around bottle. It is done quicker than it takes to tell about it.

"Breathe now," says the flight officer. "You'll feel fine as soon as you get down to ground level. Bends rarely last long below 25,000 feet."

The two men walk into the lock, the small anteroom that separates the working chamber from the outside. The door closes.

"Shall I take you up, sir?"

The chief operator never takes his face out of the porthole. On the other side we see another face. It is the observer. He, too, continually has us under surveillance.

"Take us up to 38,000 feet again."

Our ears adjust themselves easier going up than coming down. I return to my reading. So far in the book, only one person has been murdered and the blurb says that there are three more to go. Dimly we can hear the door open that connects the lock with the outside. The blonde man with bends and the lock man are down.

"Two and a half hours to go, sir. Everythink okay?"

The flight officer is the only one not reading. Again he looks questioningly at us.

"Everything's okay."

AND there we stay for three hours. And there others of you will stay for three hours —if you don't develop areoembolism or bends and have to be taken down in the lock.

There is nothing dangerous or difficult about it. It is a fine place to catch up on reading, for it is completely comfortable. But it is more than just a strange method the C. O. has thought up to keep you busy for three hours. On the results of this test run at high altitude may well depend your

Portable decompression chambers mounted on trailers can be taken right to the front-line airfields to test flying personnel for high altitude operations.

What's your AIR FORCE I.Q.?

Get your sights on these questions and fire, scoring 5 for each correct answer. Ninety points is a direct hit; 80 a near miss; 70 is certain damage and 60 is close. Incidentally, send in your suggestions for quiz questions, with the correct answers. We'll give full credit for all contributions. Answers to this month's teaser on Page 33.

1. *Tulagi is located in*
- a. The northern part of Japan
- b. The Solomons
- c. Southern Russia
- d. Off the tip of Alaska

2. *There are four major classifications of aerial bombs. Three are listed here. Add the fourth.*
- a. Demolition
- b. Incendiary
- c. Chemical
- d. ?

3. *At high altitudes, where the temperature is low, the speed of sound*
- a. Increases
- b. Decreases
- c. Remains the same
- d. Disappears

4. *The flight recording instrument called the "crab" is used on a*
- a. Helicopter
- b. Glider
- c. Link Trainer
- d. AT-6

5. *How many AAF planes now in production have four-bladed propellers?*
- a. 3
- b. 1
- c. 2
- d. 4

6. *In Air Forces slang, a cadet who is told to "grab a brace"*
- a. Lies down on his bunk
- b. Stands at parade rest
- c. Grabs a pair of suspenders
- d. Pops to an exaggerated position of attention

7. *The German Messerschmitt 109 F is a*
- a. Twin engine single-place fighter
- b. Twin engine light bomber
- c. Single engine, two-place fighter
- d. Single engine, one-place fighter

8. *When the bombardier, talking to the pilot over the intercom, says "Roger" he means*
- a. Message received—will reply
- b. Okay or message received
- c. Bombs away
- d. Scram or let's get home

9. *How many AAF fighter planes now in production have tricycle landing gears?*
- a. 1
- b. 4
- c. 3
- d. 2

10. *Westover Field is located nearest to*
- a. El Paso, Texas
- b. Chicopee Falls, Mass.
- c. Salt Lake City, Utah
- d. Rome, New York

11. *When greeting a lady, it is preferable for an officer to*
- a. Tip his cap
- b. Bow from the waist
- c. Give a soft salute
- d. Nod a greeting

12. *What are the doldrums?*
- a. Drums from which fuel is doled out
- b. A belt of calm moist air centered near the equator
- c. Low cloud hazes over central Europe
- d. A belt of cold dry Arctic air

13. *When an officer enters the mess hall, an enlisted man should*
- a. Rise
- b. Continue to eat unless addressed
- c. Salute
- d. Say hello

14. *How many General Orders are there for guard duty?*
- a. 9
- b. 14
- c. 12
- d. 11

15. *Emergency life rafts are inflated with*
- a. Carbon monoxide
- b. Carbon dioxide
- c. Sulphur Trioxide
- d. Carbon Tetrachloride

16. *The YAK-1 is*
- a. An Eskimo canoe used by our Alaskan forces
- b. A pre-historic animal
- c. A Russian fighter plane
- d. A Jap dive bomber

17. *The Chief of the Air Staff is*
- a. Maj. Gen. G. E. Stratemeyer
- b. Maj. Gen. W. R. Weaver
- c. Maj. Gen. B. K. Yount
- d. Maj. Gen. O. P. Echols

18. *Identify the plane below:*
- a. Mosquito bomber
- b. Stormavik
- c. Bristol Beaufighter
- d. Me-109F

life, the lives of other crew members and the successful completion of your mission.

How are bends caused? Something happened to me on that flight that illustrates how bends or aeroembolism is caused.

I forgot to take my wrist watch off before entering the chamber. At 8,000 feet there was a tiny pop and then a tinkle. The crystal had blown off my watch. I have a waterproof, hence airtight, watch. After winding it that day, I screwed the stem down. It meant that the air inside the watch was at ground level atmospheric pressure. When we went up, the air outside was at a lesser pressure than the air inside the watch. As we went higher, the pressure outside became less, which meant that the air locked in the watch had a greater pressure and greater force. By the laws of physics, this air demanded that the pressure be equalized. It equalized—at the expense of my buying a new crystal. This, however, will not happen to an ordinary watch for they are not airtight.

In the human body, the gases or air adjust themselves to changes in pressure. Nitrogen is a gas which makes up about four-fifths of the atmosphere. At sea level it goes into the tissues. Since it is not used by the body, it stays there. When you go up high, the pressure of gases, including nitrogen, inside the body is greater than the outside pressure.

These gases force themselves out of the body tissues and form bubbles in much the same manner that bubbles rise to the surface when the top is removed from a bottle of pop. Sometimes these bubbles cannot get out. They become lodged in the body. It is this painful occurrence that is called aeroembolism or bends.

By some peculiar physiological quirk, some bodies can adjust themselves without any trouble to such a rapid change in altitude. Others cannot, and may develop marked symptoms as low as 26,000 feet. It is for this reason that this program is under way to find out which airmen can stand high altitudes and which cannot.

How can you avoid "bends"? As has been stated, some people have a marked intolerance for higher altitudes. Their systems do not permit the pressure to equalize in their bodies. This condition seems to be due to individual physiological differences, although some of it is obviously dependent upon age and weight.

There is little that can be done about the former except that it is worth noting that some men up to the age of thirty-five can take 38,000 feet for three hours if they are in good physical condition, while some of twenty-one cannot take 32,000 feet if they are ten to fifteen pounds overweight. The deduction is obvious.

You may not be able to take high altitude, but the chances are that you can take it if you keep yourself in good condition. It is *your* responsibility to keep yourself in that physical condition which will permit you to fulfil your missions at all times, for on you alone may some day depend the outcome of what may prove to be more than just a mission. And you cannot fail. ☆

OUR AIR DEFENSE NETWORK

By Brig. General Gordon P. Saville

DIRECTOR OF AIR DEFENSE

The vast operations behind our Aircraft Warning Service — what happens before our fighter planes take to the air and how they are guided to intercept the enemy.

OUR raid on Japan a year ago this month was successful—in fact could only have been attempted—because we knew the enemy's air raid warning system had loopholes through which our planes could and did reach their objectives.

France lost most of her planes on the ground because her warning service was inadequate.

In February of last year at Port Darwin, Australia, American fighters had no warning until Japanese planes appeared overhead; consequently severe damage was inflicted and eight of ten P-40s shot down.

Take away the Army Air Forces' Aircraft Warning Service in this country and in any of the combat zones in which it operates and we might well have another Pearl Harbor or Manila.

In the last twelve months we have developed an Aircraft Warning System operating with an efficiency permitting a performance something like this: Let any enemy plane approach either coast and the Army can have fighter planes in the air within a few minutes after the approaching aircraft have been reported.

To protect our vast coastlines from probable attack *without* a smoothly operating aircraft warning service would take more than all the planes and landing fields we're now using in all theaters of operation. And even then it would be almost impossible to guarantee any real measure of protection.

It has been estimated that one plane on "ground alert" through an adequate warning system is worth more than sixteen planes in the air on "search patrol." The other fifteen planes and their crews can be released to carry the offensive to the enemy in Europe, Africa, the Aleutians, the Southwest Pacific.

The words "forewarned is forearmed" never had greater significance than at this moment. In today's war seconds count. And an alarm system that is built on split-second timing means the complete dove-tailing of many organizations—the Air Forces and its fighter units, the Navy, the Signal Corps and its vital communications network, anti-aircraft artillery, the CAA and other civilian government agencies—and the cooperation of thousands of individuals, both civilian and military.

The Aircraft Warning Service is the spinal cord which activates these groups. None can function until the AWS tells them to.

But it's not only a *warning* system. It goes farther than that, for it is charged also with the vital task of *guiding* the fighter planes: it tells them where to go to effect an interception at our advantage, helps them with the fighting job when they get there, and leads them safely back to base. At the same time, the system is used to instruct personnel for actual combat training by reporting aircraft movements during "trial" interceptions.

The exact operation of this tightly woven network and many of the devices which make that operation successful are closely guarded secrets. But the system can be outlined in general terms. Let us assume that a flight of Japanese bombers is speeding toward our shores to deliver a paralyzing blow on a strategic target a hundred miles inland somewhere in the Pacific northwest.

WHEN it comes, this bombing party will be met by a reception line it hadn't counted on. There will be no Pearl Harbor. There cannot be, for this is what will happen:

First, the long arms of our radio locators will pick up this flight while it is still miles out at sea. These detectors, carefully located so that the radii of their "sweep" overlap, literally are the "ears" of the Air Forces. The "reflections" coming from them can be translated in terms of the altitude and speed of the approaching planes. Long before it reaches our shores, the Jap flight could be intercepted by fighter craft of our own forces in sufficient strength to smash it or send it running for cover. But remember, 150 miles out might be only thirty minutes by bomber.

So let us continue the assumption and pretend that some of these enemy planes blast their way through our fighters and continue to head inland—or let us pretend that the flight approached under cover of "radio silence" by means of aircraft carrier, or by submarine. And suppose, therefore, that the enemy flight is so close to shore that the interception is too late to keep the flight over the sea. Suppose it actually hits the coast and disperses. What then? The sky is a wonderful place in which to hide, and you can't stretch barrage balloons over 2,500 miles of Pacific coastline. Besides, only one plane with a well-placed bomb load could do the trick on our mythical target.

It is at this point that the "eyes" of the Air Forces have their inning, and the Ground Observer Corps swings into action. On all coasts, and for an undisclosed distance inland, thousands of observation posts dot the map. They are only a few miles apart and are so placed that their fields of vision overlap, making it virtually impossible for a plane to fly unreported.

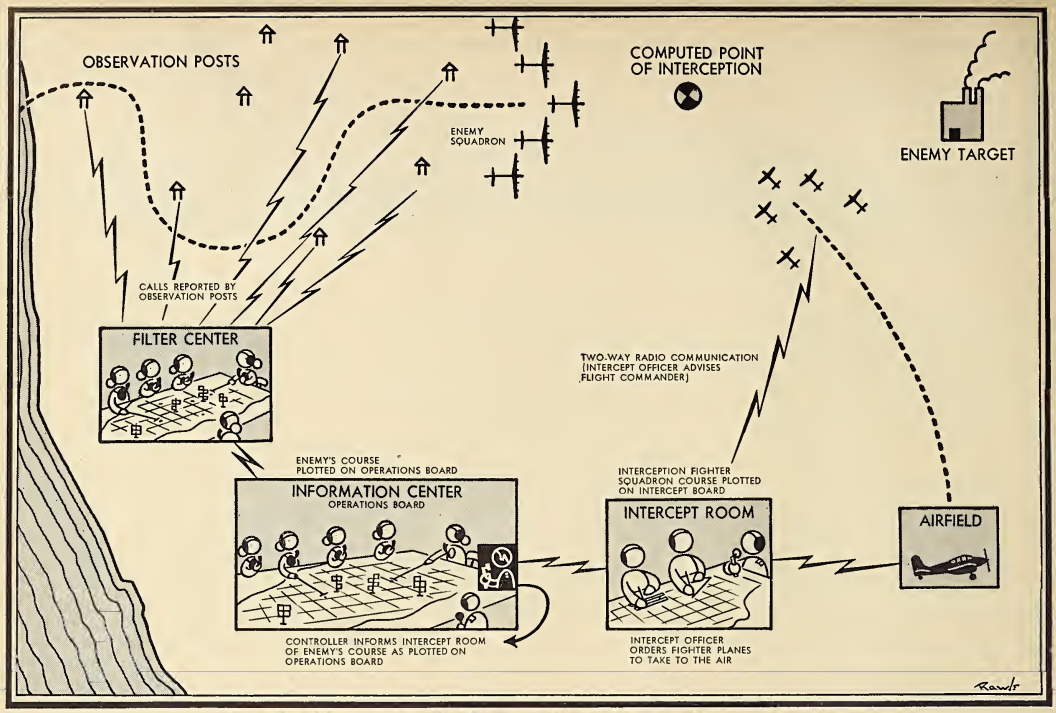
One and a half million civilian volunteer observers man the posts on a 24-hour basis and report by telephone—or by means of radio in isolated cases—any plane seen or heard at any time of day or night. Within seconds from the time their flash call is placed, the mythical flight in question has been either identified or marked unknown. If it's the latter, fighter squadrons have been notified to take the air.

That's our answer in a nutshell to any enemy plane that invades our shores.

Back of this apparently simple game of remote-control tag lies an intricate and complex organization representing months of careful planning and execution. A good aircraft warning system is made up of four components—*detection, reporting, evaluation,* and *dissemination.* So far we have dealt with only the first of these—the eyes and ears. We have assumed that an enemy flight invaded our shores and that we intercepted it. In between these two operations plenty of activity has been going on.

Somewhere between Seattle and Portland some of the planes of our mythical enemy flight pass over an observation post. To the two observers on the post, they are just planes at this point, for it's not the observer's job to decide whether they are friendly or unfriendly. As soon as one of the observers spots the planes, he lifts his post phone and says "Army Flash." The operator, having first checked the station from which the call is coming, gives the call precedence over all others and connects the observer to his nearest filter center. There the call is taken by one of several women "plotters," all of whom are volunteers working for the Air Forces.

The observer reports only non-technical facts: "Army flash..four..bi..high..seen ..5 TOM 89..NW..3..SE"—which means that he has seen four bi-motored



Details of how controlled interception guides our fighter planes.

planes flying high three miles northwest of his post headed southeast. In a matter of seconds, this call—and preceding calls from a string of observation posts reporting these planes—is plotted on the filter board.

Arrows placed flat on the board beside the "target-stand"—representing a definite flight—show the direction of the flight, which of course may change from moment to moment. At a regularly timed interval, the color of the arrows is changed, making it easy to compute the speed of the planes in question. The exact distance between the posts of course is known, also the exact minutes or seconds between ground observer calls. By clocking the target at half-minute intervals and allowing roughly two miles a minute for trainers, three miles a minute for bombers, and over four miles for fighters, you can determine the type of ships they are.

Now the "filtered" information is ready to go over leased "hot" telephone wires to the Army Information Center. "Tellers" report the movement of all targets on the filter board to the operations room in the Information Center. This room is the nerve center of the whole AWS. Into it comes the sifted and corrected information boiled down from several filter centers. Here, and here only, the decisions are made that will send up fighter aircraft against the enemy planes. It is here that the call goes out to antiaircraft units, to the FCC to silence the broadcasting stations, and to the Civil Air Raid Warning Control Centers. It is here that the two final steps of our program are completed: *evaluation* of the information reported, and *dissemination* of it.

We will look carefully at an operations board, for the principles employed here are the same as those in operation in an active air defense program in every combat zone where we have bases and planes in action—in Africa, in the Pacific and in the Aleutians, as well as in the continental United States. It is a system that will render unlikely a repetition of the tragedies of Clark Field, of Nichols Field, of Hickam.

THE operations board is like the filter board only larger, for it includes all the filter areas of an Air Defense Wing. Here other plotters—also volunteer workers—receive information, this time from the filter boards, and plot duplicate records of the flight of our enemy ships. But at this moment we still don't know whether they are friendly or hostile. Also in the operations room is the "seaward" board in a vertical position along the one wall, on which all flights approaching from the sea are plotted.

Key men in the defensive phase of combat operations sit along a gallery overlooking the boards. Their names are not known. Theirs is an anonymous behind-the-scenes job, but they may hold in their hands the fate of thousands. In this gallery, every minute of the day and night, are representatives of the Army, Navy and CAA. Since all airplane flights today are scheduled and the proposed route of each plane's flight is reported and approved before a flyer can take off, these men know ahead of time every friendly ship that is going to be in the air, at what time and where.

It was only about ninety seconds ago that the flight of enemy ships first seen over the observation posts was reported to the operations room and a target-stand representing it is now on the board. The raid clerk, also a civilian volunteer, spots this new flight, picks up her telephone, cuts into a conference circuit which automatically connects her with all three liaison men, and queries them in turn on the identity of the flight. Each man checks the approved flight records for the day. The Naval officer says they are not his planes. So does the CAA representative. The Army officer also disclaims the flight.

This is the moment. Things happen now. A red "X" goes up on top of the target, and now it's the Controller's turn. The show is his and he works rapidly. Until a plane is positively identified as friendly it is assumed to be hostile. The Controller acts for the Commanding Officer of the Wing and the responsibility is his to get the fighter squadrons into the air. He turns to the pursuit officer beside him. "Get 'em" he says simply.

Alongside the Controller are two boards—a weather board listing latest meterological conditions and a "status" board which

shows the availability, position and condition of all our fighter squadrons in that region. Out on field "Y", planes from the "Blue" squadron are warmed up, their pilots ready at a moment's notice to take to the air. The pursuit officer, who has all this information before him, notifies the Commanding Officer of that field: "Flight 2, Blue squadron.....climb 15,000.....fly vector one..eight..eight..scramble."

The Controller meanwhile has notified other key persons on the gallery: The anti-aircraft artillery officer keeps in constant touch over his own direct wires with the AA units, but he doesn't give them the word to shoot until the Controller says OK; those fighter planes must be out of the way first. Barrage balloons go up, searchlights pierce the blackness. The CAA representative has ordered all civilian craft grounded. Ground force officers are notified. The Civil Air Raid Warning officer orders a blackout. (Or if all this takes place in a combat zone, a similar warning goes out to all ground units and other installations.)

MEANWHILE, what is happening to our Blue squadron? The enemy flight has changed its course, according to the observers' report. So the Blue squadron will have to be notified. Once the planes are in the air, the intercept officer keeps in constant touch by very high frequency radio with his pursuit flight and can guide the planes to be the exact point of contact with the enemy where it will be to our advantage. The enemy's course is charted on the operations board and also on an intercept board for tactical purposes. The movements of the Blue squadron, at precisely the same moment, also are charted on the intercept board, around which officers consult the compass rose, measure distances and air speeds, make computations with lightning speed, and tell the flight commander up above exactly how many degrees to vary his course to effect an interception. When the flight commander tells the intercept officer that contact has been made, the latter is then satisfied—and not until then—that the Aircraft Warning Service has done its job.

One glance at the accompanying chart will illustrate the necessity of constant and accurate detection and reporting if a warning service is to be successful. Remove the eyes and ears of the Air Forces and the whole system collapses. The importance of the far-flung civilian Ground Observer Corps cannot be emphasized too strongly. Because of it, a great network of activity is set into motion long before our planes are ever notified to leave the ground. Because of it, pilots do not have to risk lives or planes unnecessarily.

Last summer, the Army Air Forces assumed complete control of the ground observer organizations and welcomed as a vital and official part of its personnel the 1,500,000 civilian volunteers who keep the posts going. The job they are doing is of such importance that if they were suddenly to be withdrawn soldiers would have to man the posts themselves. On one coast alone this would require two entire divisions.

The Corps fortunately is no respecter of personalities, the chief requisites for a good observer being patience, ability to stand some amount of hardship, on-the-job training, and an overwhelming desire to serve with and for the men in the Army Air Forces and their country. There can be no selfish motives connected with being a volunteer observer, for these people have taken upon themselves one of the most thankless jobs in the nation. They do not wear uniforms, nor tin hats, nor any other characteristic insignia in public, and they are specifically asked not to talk about their work. The duties of a ground observer are often inconvenient, sometimes physically uncomfortable, almost never glamorous.

Yet collectively they are writing one of the greatest and most exciting chapters in the history of the Air Forces. They are writing it from the top of a windswept mountain in Oregon, from a fog-shrouded hillside in San Mateo, from a rocky cliff in Maine, from a lonesome desert watch near Yuma, from a pine forest in North Carolina, from under scorching suns in Imperial Valley, from the top of a Manhattan skyscraper, from the village church steeple.

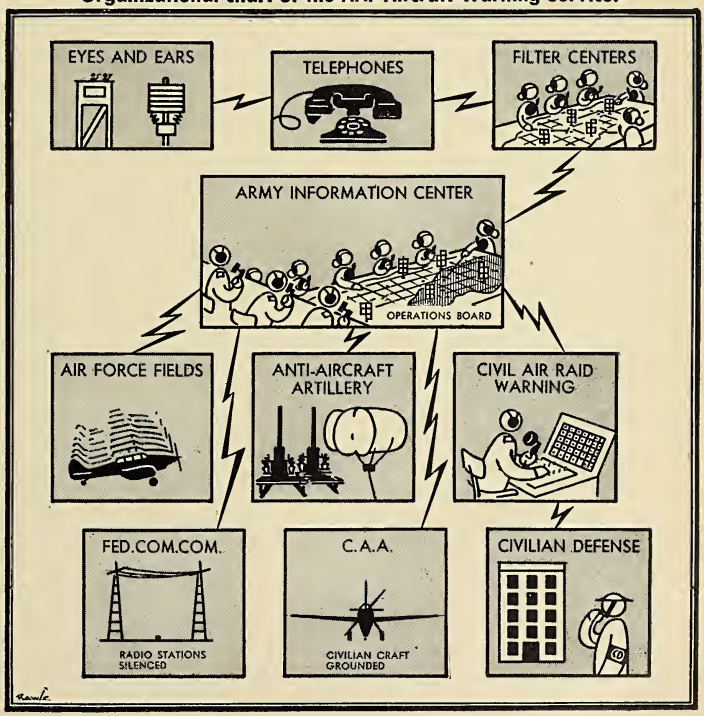
They may report 100 planes in one hour; they may report none in a whole year's time. They may report a submarine off-shore, or a lost plane circling in a blinding fog. They may report a forest fire, or an object being dropped by a parachute. And in a high moment unsurpassed for sheer drama, they may report, as indeed they did, a strange, small black plane dropping an incendiary bomb in the vast lonely wilds of an Oregon forest. Or maybe they'll report a flock of geese "Northeast, flying 'very high.'"

Stories from the First Fighter Command on the east coast, from the Third on the Gulf coast, from the Fourth on the west coast pour into this office praising the gallantry, the sacrifices, the enduring patience in the face of great odds, the amazing and almost incredible performances of the scattered members of this unique body.

Stories of mothers, fathers of sons in the service, stories of housewives, teachers, bricklayers, doctors, Broadway actresses, artists, mechanics, movie stars. Stories of Joe and Bill and Mary Ellen and Mrs. Brown and Mr. Stevens down the street.

Around the clock—day after day—night after night—in calm and storm—every day, war is a reality to the men and the women, to the civilian volunteers and the military personnel of the Aircraft Warning Service. The stakes are high. There can be no time out, no relaxation from this watch to meet the ever-present threat of attack by a desperate enemy. Whether it's on the "deck" of an operations room, the catwalk of a remote observation post, or the "ready" room of a fighter squadron, the deadly seriousness of the whole undertaking means but one thing: We are ready. ☆

Organizational chart of the AAF Aircraft Warning Service.



Air Forces

A monthly record of decorations awarded to personnel of the Army Air Forces.

Sgt. Roy R. Taylor

Capt. A. H. Anders

Major C. E. Griffith

Lieut. Ralph K. Watt

DISTINGUISHED SERVICE CROSS

CAPTAIN John G. Evans. **LIEUTENANT** Joseph A. Beck. **TECHNICAL SERGEANT** Guy K. Dozier (Also Oak Leaf Cluster to Distinguished Service Cross and Oak Leaf Cluster to Silver Star).

DISTINGUISHED SERVICE MEDAL

BRIGADIER GENERALS: Asa N. Duncan*, Alfred J. Lyon*.

SILVER STAR

LIEUTENANT COLONELS: Herbert Morgan, Clinton Vincent. **MAJORS:** Paul F. Davis, Walter Y. Lucas (Also Distinguished Flying Cross). **CAPTAINS:** George A. Carter, Horace E. Crouch, Jack D. Dale, Herbert L. Egenes, F. C. Hallor, Sam R. Oglesby, Frank R. Royal (Also Oak Leaf Cluster to Silver Star), N. S. Saliba. **LIEUTENANTS:** William B. Adams, James A. Anderson, Charles O. Brown, Jr., Frank M. Burton, Clayton J. Campbell, Jackson B. Clayton, James R. Copeland, Walter B. Decker, Theodore P. Deffner, Ernest M. Duckworth, James I. Easter, Joseph W. Ferguson, Luther G. Fisher, Donald L. Geror, John M. Hill, Arthur J. Hobday, W. Humrichouse, Jean D. Jackson*, Grady H. Jones, Glade Jorgensen, John J. Keeter, Jr., Claude V. Leffingwell, Thornton H. Lewis, Robert E. Longstreth, Harold C. McAuliff, E. E. McRoberts, J. M. Moore, Jr., S. M. Nanney, Horace E. Perry, Lamar C. Peterson, R. L. Rhoades, John E. Roesch, F. R. Schmidt, Walter L. Shea, Emanuel Snitkin (Also Oak Leaf Cluster to Silver Star), Glenn W. Sorensen, D. S. Stauffer, F. E. Timlin, Peter L. Vlahakes, Eugene A. Wahl, Ralph K. Watts, Jeffery O. Wellborn, Howard B. West, Donald M. Wilder, Raymond H. Wilkins, Roger H. Williams, Bennett G. Wilson, John Zarlengo. **MASTER SERGEANTS:** Firman S. Adams (Also Purple Heart), Henry A. Hartman, Joe J. Mullenix. **TECHNICAL SERGEANTS:** Louis M. Blackwell, Marvin L. Breeding (Also Purple Heart), Thomas J. Chapman, Joseph E. Farmer (Also Purple Heart), Harold Fitzgerald, Leonard M. Fox, Ledford L. Hicks, Albert D. Johnson, Kenneth Lawton, Robert B. Martin, J. P. Pendleton, John A. Potters* (Also Purple Heart*), William Prince, D. E. Slayton, Lawton L. Tabor, A. C. Townsend, William G. Weiss, Roy J. Wilhite. **STAFF SERGEANTS:** Claudie F. Anglin, Henry R. Ballentine, Lee A. Benbrooks, Nicholas T. Brozack, John W. Bruce, Morris A. Cannon, Jack W. Coleman*, John A. Cook, Irving Cutler, Robert J. Dunn, Jr., Albert S. Fisher, John C. Haddow, Robert W. Halliday, Dudley D. Handord, Jr., James E. Houchins*, Grover L. Knox, Felix H. Larronds, J. H. Londgren, C. R. Middaugh, John Nappi, W. J. Pananes, W. E. Portzline, George Scherba, Howard A. Tanner, Roy R. Taylor, Leo Wheatley, Douglas H. Williams. **SERGEANTS:** Harley S. Baird, Sheldon D. Beaton, E. J. Bornhiemer, John Brewer, Joseph J. Brust, William L. Burt, Bernard Carroll, Philip H. Childs, Norman L. Davignon, Ray L. Draper, Jack O. Ehrke, H. F. Elsasser, H. C. Fishencord, Frank Frucci, Joseph A. Gauthier, John P. Gaydos, Robert J. Haessly, Alvin L. Hartman (Also Purple Heart) Eric B. Ives, Wayne E. Johnson, John E. Kaminska, Lewis H. Keightley*, Wilmer L. Kidd, James M. Kokales, Donald J. Kundinger, Allan W. Larocque, John H. Laurie, Paul R. Lennon, Irving W. Lnenicka, W. E. Lyndley, Dallis W. McGill, Donald S. Mackay, Robert C. Mongrain, F. L. Newland, R. H. Newman (Also Purple Heart), Robert K. Palmer, Harold W. Peel, Art P. Phillips, F. W. Plunkett, Meddie N. Poirier, Stanley Poplaski, William E. Rembt, M. B. Russell, George Ryan, Jr., C. E. Salmon, Jr., Matt Schu, D. H. Simpson, Earl W. Snyder*, Raymond Sousa, Albert St. Jean, G. C. Stevens, Robert B. Sylvester, John F. Szymonik, J. H. Thompson, Raymond E. Transon, D. R. Vance, James R. Weed, Edward F. Weingard. **CORPORALS:** Willett T. Allen, Donald C. Bargdill,

* Posthumous.

ROLL OF HONOR

Maj. Gen. F. Bradley

Lieut. C. O. Brown

Capt. Albert S. Aiken

Capt. Arthur T. Rice

Lieut. D. C. Hawley

Major John K. Carr

Capt. G. Cherymisin

Capt. Fred Eaton, Jr.

Lieut. G. A. Simeral

Lieut. F. E. Timlin

Lieut. John Zarlengo

Corp. Frank L. Melo

William C. Benn, Russell F. Boudria, John B. Boyle, Jr., Wayman E. Curry, George Cuzzone, James V. Dixon, Ralph C. Fritz*, Robert L. Fuller, James L. Gamble, John Gregal, Lowell K. Hammond, Philip E. Holmgren, Donald Jauhlainen, S. J. Jones, Robert J. Knapp, Melvin Lomax, R. E. McClure, Robert L. Moore, Herbert E. Mutz, J. J. O'Brien, R. F. Penzenik, Donald Perry, E. M. Schaeffer, Jr., V. A. Stewart, Maurice A. Thomas, J. M. Thompson, Jr., Herbert W. Triplett, Richard M. Wallace, Therman L. Wolfe. **PRIVATES FIRST CLASS:** Floyd Barbour, W. W. Merithew, Frank Parisi, Marx E. Roberts, W. E. Saboid, William A. Takala, E. VanEvery, H. M. Wheatley, Jr. **PRIVATES:** Joseph A. Barker, Joseph N. Budde, Kenneth D. Dake, Arnold E. Klimpel, Boyd H. Parker.

OAK LEAF CLUSTER

To Silver Star

CAPTAINS: Frederic C. Eaton, Jr., Bruce H. Bennett. **LIEUTENANTS:** Donald J. Green, Ernest L. Reid, Coleman Stripling, Paul I. Williams. **MASTER SERGEANT** Ralph J. Stiles. **TECHNICAL SERGEANT** Charles C. Schierholz. **STAFF SERGEANT** William V. Koon. **CORPORAL** James C. Underwood.

PURPLE HEART

MAJORS: Frank P. Bostrom, Ivan C. DuBois, W. A. Fairfield. **CAPTAINS:** A. L. Fangman, James G. Kandaras (Also Air Medal), R. A. Redburn, Martin R. Walsh, Thomas K. Winburn, William G. Workman. **LIEUTENANTS:** Donald E. Andersen, Edward S. Ashley, George E. Boyd, John G. Brennan, Albert M. Buck, Howard F. Cooper, Gerald T. Dix, Roy W. Evans, James A. Hilton (Also Air Medal), Arthur E. Hoffman, Jack P. Hopkins, Dave H. Hoyer, Earl R. Kingsley, John C. Lynch, Lyn Parker, Jr., Theodore I. Pascoe, James H. Reilly, Frederick C. Roberts, J. F. Segrest, Jr., F. D. Stanton, Harold M. Stearns, Robert L. Stimson, Meech Tasquah, Hugh J. Toland, William R. Walker, Jr., T. G. Wuerple*. **MASTER SERGEANTS:** Francis J. Donahue, Melvin L. Hall, L. B. Pouncey, George B. Sparks. **TECHNICAL SERGEANTS:** Elmer Anderson, George H. Bengal, Norman L. Cates, Homer E. Ferris*, Melvin F. Hooper, Samuel Langer, Melvin E. Owens, Aden L. Simons, David Suppes, Jr., William B. Wherry. **STAFF SERGEANTS:** Robert H. Baldwin, Sam K. Bourne, Tony Bruce, Charles B. Cameron, Eilert H. Cremer, W. R. Crutchfield, Salem M. Drake, George T. Dwyre, James S. Everett*, Paul B. Free*, K. W. Gatewood, John J. Gogoj, Benjamin Gordon, James E. Guthrie, Theodore V. Hobbie, Edward J. Kozloski, John W. Lynch, John J. Meehan, William W. Neal, Lincoln T. O'Connel, Forest A. Oltman, John A. Price*, P. J. Scheidt, L. B. Velarde. **SERGEANTS:** John Banco, Hurian H. Beauman*, Roy G. Brewer, Robert A. Carey, Raymond J. Collins, L. H. Cooper,

(Continued on Page 38)

Air Forces ROLL

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BRIGADIER GENERALS: Asa N. Duncan*, Alfred J. Lyon*.

SILVER STAR

LIEUTENANT COLONELS: Herbert Morgan, Clinton Vincent. **MAJORS:** Paul F. Davis, Walter Y. Lucas (Also Distinguished Flying Cross). **CAPTAINS:** George A. Carter, Horace E. Crouch, Jack D. Dale, Herbert L. Egenes, F. C. Hallor, Sam R. Oglesby, Frank R. Royal (Also Oak Leaf Cluster to Silver Star), N. S. Saliba. **LIEUTENANTS:** William B. Adams, James A. Anderson, Charles O. Brown, Jr., Frank M. Burton, Clayton J. Campbell, Jackson B. Clayton, James R. Copeland, Walter B. Decker, Theodore P. Deffner, Ernest M. Duckworth, James I. Easter, Joseph W. Ferguson, Luther G. Fisher, Donald L. Geror, John M. Hill, Arthur J. Hobday, W. Humrichouse, Jean D. Jackson*, Grady H. Jones, Glade Jorgensen, John J. Keeter, Jr., Claude V. Leffingwell, Thornton H. Lewis, Robert E. Longstreth, Harold C. McAuliff, E. E. McRoberts, J. M. Moore, Jr., S. M. Nanney, Horace E. Perry, Lamar C. Peterson, R. L. Rhoades, John E. Roesch, F. R. Schmidt, Walter L. Shea, Emanuel Snitkin (Also Oak Leaf Cluster to Silver Star), Glenn W. Sorensen, D. S. Stauffer, F. E. Timlin, Peter L. Vlahakes, Eugene A. Wahl, Ralph K. Watts, Jeffery O. Wellborn, Howard B. West, Donald M. Wilder, Raymond H. Wilkins, Roger H. Williams, Bennett G. Wilson, John Zarlengo. **MASTER SERGEANTS:** Firman S. Adams (Also Purple Heart), Henry A. Hartman, Joe J. Mullenix. **TECHNICAL SERGEANTS:** Louis M. Blackwell, Marvin L. Breeding (Also Purple Heart), Thomas J. Chapman, Joseph E. Farmer (Also Purple Heart), Harold Fitzgerald, Leonard M. Fox, Ledford L. Hicks, Albert D. Johnson, Kenneth Lawton, Robert B. Martin, J. P. Pendleton, John A. Potters* (Also Purple Heart*), William Prince, D. E. Slayton, Lawton L. Tabor, A. C. Townsend, William G. Weiss, Roy J. Wilhite. **STAFF SERGEANTS:** Claudie F. Anglin, Henry R. Ballentine, Lee A. Benbrooks, Nicholas T. Brozack, John W. Bruce, Morris A. Cannon, Jack W. Coleman*, John A. Cook, Irving Cutler, Robert J. Dunn, Jr., Albert S. Fisher, John C. Haddow, Robert W. Halliday, Dudley D. Handord, Jr., James E. Houchins*, Grover L. Knox, Felix H. Larronds, J. H. Londgren, C. R. Middaugh, John Nappi, W. J. Pananes, W. E. Portzline, George Scherba, Howard A. Tanner, Roy R. Taylor, Leo Wheatley, Douglas H. Williams. **SERGEANTS:** Harley S. Baird, Sheldon D. Beaton, E. J. Bornhiemer, John Brewer, Joseph J. Brust, William L. Burt, Bernard Carroll, Philip H. Childs, Norman L. Davignon, Ray L. Draper, Jack O. Ehrke, H. F. Elsasser, H. C. Fishencord, Frank Frucci, Joseph A. Gauthier, John P. Gaydos, Robert J. Haessly, Alvin L. Hartman (Also Purple Heart) Eric B. Ives, Wayne E. Johnson, John E. Kaminska, Lewis H. Keightley*, Wilmer L. Kidd, James M. Kokales, Donald J. Kundinger, Allan W. Larocque, John H. Laurie, Paul R. Lennon, Irving W. Lnenicka, W. E. Lyndley, Dallis W. McGill, Donald S. Mackay, Robert C. Mongrain, F. L. Newland, R. H. Newman (Also Purple Heart), Robert K. Palmer, Harold W. Peel, Art P. Phillips, F. W. Plunkett, Meddie N. Poirier, Stanley Poplaski, William E. Rembt, M. B. Russell, George Ryan, Jr., C. E. Salmon, Jr., Matt Schu, D. H. Simpson, Earl W. Snyder*, Raymond Sousa, Albert St. Jean, G. C. Stevens, Robert B. Sylvester, John F. Szymonik, J. H. Thompson, Raymond E. Transon, D. R. Vance, James R. Weed, Edward F. Weingard. **CORPORALS:** Willett T. Allen, Donald C. Bargdill,

* Posthumous.

With the "tri-metrogon" camera, involving three ingeniously synchronized mechanisms, a single plane can photograph 8,000 square miles of terrain per hour.

Camera Scouts

-INTRODUCING OUR PHOTOGRAPHY DIRECTORATE

By Captain Milton R. Krims

DIRECTORATE OF PHOTOGRAPHY

How the Air Forces bring information back alive — on celluloid — for fighting a war.

IT IS said that an army moves on its belly. And somehow it is taken for granted this army knows exactly where to go—like a hungry boy following the scent of hot doughnuts. But there are no happy scents to follow in war, no succulent sign posts; the way is too often difficult and obscure, with no one knowing exactly where it leads. If an army would go in the right direction it must have clear, sharp, knowing eyes.

We are familiar with the heroic and almost legendary figure who rides or runs far ahead of armies, sprawls on his stomach to peer furtively from behind a tree—often with one hand shading his eyes from the blinding sun—and then dashes wildly back to headquarters to make his report.

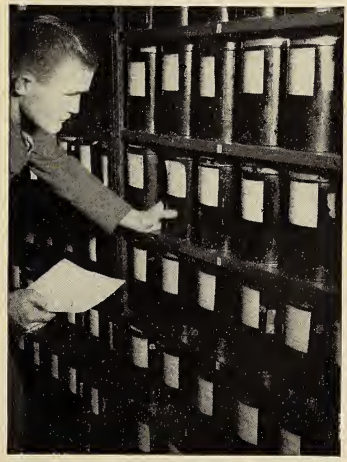
Times have changed. Scouting is no longer as simple as that. It is accomplished by airplanes and skilled pilots, by maps and charts and cameras and by technicians with the minds of scientists and the dexterity of supercraftsmen. And all because the modern scout not only sees but makes a film record of what he sees.

The Directorate of Photography, Maps and Charts actually came into being in the spring of 1942. But the First Photographic Squadron of the Army Air Forces and its future was still ahead. Its first job was nothing more or less than to chart the entire Western Hemisphere from the air.

By the old method, aerial pictures were taken with the camera pointed vertically or obliquely towards the earth. These oblique negatives were later processed by a large and complicated machine called a restitutional printer. To do the hemisphere job this way would have required more film than existed in the world, not to mention men, cameras and planes.

Minton W. Kaye was in charge of the First Photographic Squadron. He was a Major then, recently promoted and fresh from an assignment in Hawaii. But he knew photography and all those who had to do with it. He knew he must find some new method which would be economical in time, men and equipment. He also knew that the Alaskan Branch of the Geological Survey had perfected an oblique method of plotting; that is, a method by which topographical information could by mechanical means be taken off a photograph which was not pointed directly at the earth. The survey had worked out this method in Alaska because it had no air pictures and therefore no alternative. Colonel Bagley, now retired, had developed the Alaskan method. Major Kaye gathered in another Alaskan specialist, Gerald Fitzgerald, and, with the help of the First Mapping Group and others, finally emerged with the system of "tri-metrogon" charting which solved the problem.

"Tri-metrogon" simply means "wide angle, horizon to horizon". With a tri-metrogon camera you can cover eight times the area in a single flight that you could with the old style vertical photography setup.



The world in a can

The photograph from a tri-metrogon camera covers twice as many miles as you are thousands of feet high; that is, if you are at 20,000 feet, your picture covers a forty-mile area. One plane can photograph 8,000 square miles of terrain per hour. The plane travels 200 mph at 20,000 feet, and there are forty seconds between exposures.

After processing, the photographs are given to compilation units, who solve the problem of restitution by graphical means. This is a long and extremely complicated process and is done—actually—with mirrors. And not only mirrors, but pins, mechano sets, glass, string, lights and good eyes and steady hands.

The Air Forces got the charts it wanted, and also found itself with a new directorate on its rapidly growing hands—the Directorate of Photography, Maps and Charts. Minton W. Kaye naturally became its Director and in due time a full Colonel.

AND that's only the start of the story.

The growth of the Directorate of Photography, Maps and Charts has kept pace with the growth of the Army Air Forces. It has become a vast organization spread out all over the world. It has never stopped taking pictures, and, what is perhaps as important, it has never stopped looking for new ways to take them. The modern, fast moving mechanized army demands equally modern, fast action scouting. It wants information right now. Colonel Kaye and the Directorate organized to give it that information.

It would be over-simplification to say that the Directorate's work is divided into two parts—preparation and operation. Preparation in itself involves diverse and complex operation. It all grows from a simple sentence in a directive which reads: "Advises the Commanding General, Army Air Forces, his staff and the Directorates thereunder on matters pertaining to photographs, maps and charts."

Broken down into terms of hard work, it means that the Directorate studies and creates photographic and charting programs, priorities and requirements; researches the capabilities of photographic aviation and

With the "tri-metrogon" camera, involving three ingeniously synchronized mechanisms, a single plane can photograph 8,000 square miles of terrain per hour.

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AIR FORCE, *April, 1943*

possibilities of development; establishes tactical and technical photographic and photogrammetric doctrine.

To accomplish these varied missions, laboratories and schools and personnel and equipment are required. And the information thus gathered must be transmitted to the men who will make operational use of it. That means more laboratories and schools and personnel. Since the Directorate determines photographic policy, it must now establish facility, direct procurement and supply methods for equipment and personnel of operational units.

The personnel of the Photographic Reconnaissance Operational Training Unit of the Army Air Base at Colorado Springs numbered exactly zero less than a year ago. In fact, there just wasn't any such unit. Today some 5,000 to 6,000 men are in training and many squadrons have already been turned out for overseas duty.

Once there was only one type of camera for taking aerial pictures for mapping. Now there are three cameras ingeniously synchronized to work together, a slightly fantastic contraption that takes a quick look from horizon to horizon and pops a picture of what it sees. And that also is being improved. In this constant search for improvement nothing seems unreasonable. A map is no good unless there is some kind of control point or "fix" on the ground to identify its location. Naturally, the precise latitude and longitude of the "fix" must be determined to give aerial photographs something they can be "hung on to."

The method generally used to establish control points has been a triangulation network supplemented with traverse loops, but since it was too expensive in time, men and equipment, it was abandoned and consideration given to astronomical solutions.

THE beauty of astronomical fixes is that stations may be established separately, and are not dependent on other points (as is the case with the triangulation system). For this Colonel Kaye turned to the prismatic Astrolabe, an ingenious instrument of French origin.

The Astrolabe is nothing new, it was used by navigators as far back as Columbus' time. Then it was, in effect, simply a notched stick, which was held up toward the horizon. The lower notch was squared on the horizon, the upper on the North Star. If the North Star was below the notch, you were sailing too far south, if above, too far north.

The prismatic Astrolabe was somewhat more complex than a notched stick, and there were difficulties about it. In the first place there were practically none of them, and no more to be had. France had fallen. So an American instrument, the Equi-Angulator, was developed. It is much the same type of thing, but has higher power magnification and other refinements. It's a potent gadget—with four of them, for instance, an area as large as Brazil can be covered.

And, there was still more need for more speed. It is not possible, for instance, to take one observation at night. Astrolabe parties are flown in, camp made, the instrument set up, then a long night's watch has to be maintained, a great deal of computation done, then camp broken, and a flight made to the next station. A slow process when hundreds of fixes have to be made.

Lieutenant Oren Haglund says "so long" to the men he trained in the art of self defense as they depart for overseas duty as part of Captain Knox Manning's first motion picture unit. This is the first unit of its type to depart for a theater of operations.

So men went to work on a Zenith camera, an instrument which will point straight up to the stars to take Zenith photographs at the stations. This means that a picture may be taken at the precise moment some easily identified "fix" such as a network of roads is visible—an obvious advantage, for it will require no time at all to set the camera up and get the photograph. Thus a number of photographs may be taken in one night.

The Zenith photographs will be developed in the field to be sure they are valid, then shipped to Washington where astronomers will identify the stars and plot the exact latitude and longitude of the ground spot. So it goes, on and on, with men with wings and ribbons on their chests casually using scientific terminology profound enough to confuse even the enemy.

And finally out of all this preparation comes operation. The function of the scout is still the same. He gathers information to be used by higher authority for strategic and tactical purposes. So now the men go into the air, well-trained technicians, knowing all there is to know about their equipment and the duties they must perform with it.

The Directorate gathers two kinds of information. One kind has to do with charting and wings. Here the scout takes wings, flies over both friendly and enemy terrain, observes and records the facts of war. Mapping photography is done for charting purposes. Reconnaissance photography is done for intelligence use. These photo squadrons fly the fastest planes, meet the same dangers as other squadrons. The only thing that sets them a little apart is that they have nothing to shoot with except cameras.

Then there is the Motion Picture Division. This is charged with telling the story of the Army Air Forces. The story of men and equipment. Its Combat Camera Units shoot filmic reports for the Commanding General, the staff, the several commands and for Public Relations releases to the public. The tactical and technical information thus gathered is used in the making of flying training films produced by its First Motion Picture Unit in California.

All in all, it's a big and varied job and, what is most interesting, its single overall objective is to provide information and provide it as quickly as humanly possible.

It's a big story. The rest will have to be told in subsequent issues. It must be told because there is one more factor that makes the Directorate rather unique: it feels it is in business to serve and it wants everyone to know how to put it to work. It has no secrets except from the enemy. ☆

PICTURE CREDITS

First Cover: Blackland Army Flying School, Waco, Texas. 6: U. S. Army Signal Corps. 14: British Ministry of Information. 22: First Motion Picture Unit, Culver City, Cal. 24-25: Gowen Field, Idaho. 26: Wright Field, Ohio. 31: McGraw-Hill. 34-35-36-37: AAF School of Applied Tactics, Orlando, Fla. Third and Fourth Covers: AIR FORCE Staff Photographer. All other photographs secured through official Army Air Forces sources.

Life Raft SOS

WHEN an airplane makes a crash landing at sea hereafter its crew will have a much better chance of being rescued promptly, without being forced to drift around for long periods minus food and water.

Aircraft equipped with life rafts, will carry as part of their standard equipment a portable hand generator radio set. This emergency device, complete with antenna and other accessories, will communicate a distress signal for considerable distances.

This radio set was developed in the Aircraft Radio Laboratory at Wright Field, with the Air Forces, Signal Corps and manufacturer cooperating in its production. Basically it is an improved and modified version of similar German and English equipment which has summoned help for many crews in the choppy waters of the English Channel.

Use of the emergency set, as taught at Gowen Field, Idaho, Operation Training Unit radio school, is simple, for the device is so designed that men with or without radio experience can operate it.

Suppose a crew is forced down at sea. At an altitude of 300 to 500 feet above the water, two buoyant bags of equipment are tossed out of the ship. An automatically-opening parachute carries them down. The bags, painted a vivid yellow so they can be easily discerned, contain a waterproof transmitter, a simple box kite, two deflated balloons and a hydrogen generator can.

After a crew has boarded their self-inflating life raft, they would retrieve the radio set and put it in working order.

Given a wind of seven to fifty miles per hour, an antenna coiled within the transmitter is attached to the box kite which is sent up to about 300 feet. While the kite acts as a distress signal, its main purpose is to carry the antenna aloft.

If there is no wind, the two balloons are inflated from a tube of the hydrogen generator can which forms hydrogen by being lowered slowly into salt water.

It is not necessary to know code. A hand crank on the set generates power and the instrument automatically grinds out SOS messages on 500 kilocycles, the international distress frequency. If the crash landing has been made in the North Sea, where the distress signal is AA, the operator of the set merely flips a switch to emit that message.

The set, which also has a manual sending key, will send for more than 200 miles during the day and much farther at night.

A portable radio device makes early rescue possible for survivors of forced landings at sea.

Naturally it provides a beam which will guide searching planes to the raft; once the radio compass of the rescue plane "homes" on the wave, the pilot can ride the signal right to the lost boat.

If the rescuer approaches at night the raft's crew can switch from the radio signal to a blinker light signal, which blinks out an automatic SOS.

The transmitter itself is equipped with wide webbing straps to secure it in position between the legs of the operator. Power is watched and adjusted by an indicator lamp. When the lamp is brilliantly lighted, the transmitter is yelling for help.

Since all ocean-going vessels of all nationalities are required to maintain watch on the distress frequency, the chances of rescue are greatly increased even though no warships or planes are in the vicinity. There's no receiving equipment, so the crew will just have to wait and see what happens.

Flyers familiar with this new equipment believe it will do much to eliminate the danger of drifting for days in remote sea areas, and regard it as a long step forward in assuring the safe return of distressed Army Air Forces crews.—**Captain E. L. Davis, Gowen Field, Idaho.**

Pre-Rotation of Tires

Life tests recently were completed on 300 airplane tires to determine how they are destroyed in service. For the record, not one tire failed or wore out because of frictional wear occurring when the stationary tire was forced from zero miles per hour to approximately eighty miles per hour during the fraction of a second when wheels initially touch the ground in landing.

In explanation, Materiel Center engineers at Wright Field point out that most airplane tires fail from blowouts, severe bruises and cuts, bead separation, and so forth. Those tires that do not fail from the above causes wear out at the shoulder—where the weight of the plane and effects of braking are borne. *(Continued on Next Page)*

(Continued from Preceding Page)

Wear from initial contact with the ground in landing occurs at the center of the tire, and this has proved to be so slight that it does not affect its service life.

For large tires, such as the eight-foot B-19 tires, pre-rotation conceivably could reduce drag forces and permit lightening of the landing gear struts. However, the weight and space requirements of most pre-rotating devices have been too great to be of practicable value.

Leaf Spring Landing Gear

A racing plane piloted by Steve Wittman, veteran racer of Oshkosh, Wisconsin, gave the Army the idea for a new type of leaf spring landing gear for PT-13 and PT-17 training planes.

The new landing gear has been drop-tested, flight-tested, and approved by the Army Air Forces Materiel Center at Wright Field, and will be installed on 25 training planes for further testing. Although, after looking at the accompanying photograph, it might be suspected that a plane using this kind of landing gear would bounce right back into the sky upon being landed, quite

Close-up of leof spring landing gear.

the opposite is true. For when the machine hits the ground, the spring gear spreads out and each wheel serves to dampen the rebound.

Wright Field pilots who have tested the spring gear claim that it is superior in every way to landing gear used currently on planes of this type. It shows its mettle particularly in fast taxiing turns. It is softer in taxiing and less stiff when dropped in for a hard landing. There is no rebound tendency when the plane is landed on hard, dry surfaces, and even when landings are made on wet grass or ice, the rebound is negligible. In take-offs there is no apparent difference from the conventional gear installations.

The simplicity of the spring gear makes it easy to manufacture. Made from flat, non-critical steel plate stock cut to shape, drilled, and bent to form, it is cheaper to construct than the present strut and saves many hours of production time. Large-scale production is only a 60-day problem.

BB Counter

A device which automatically counts the BB's fired in a Link Trainer has been invented by M/S Melvin Wolfe, of Moore Field, Texas. (See above.)

The usual round of fire in Link Trainer shooting consists of 100 BB's, and that number must be exact in order to determine the percentage of hits scored. Heretofore, the 50,000 pellets used a day had to be counted by hand—and that's a powerful lot of counting.

Sgt. Wolfe took a solenoid from a salvaged machine gun, a vibrator motor from a Link Trainer, part of the control cable shafts from a cracked-up plane, and a couple of odd pieces from the scrap pile. He put them together, made a couple of adjustments, and the result was a BB counter which counts exactly 100 BB's, no more and no less, and drops them into a container.

The gadget consists of a tin box stilted on four springs. In the bottom of the box there's a hole just big enough to let one BB fall through at a time and under this hole, a small grease cup is suspended on a long shaft. When exactly 100 BB's fall into the cup, it turns over; the BB's drop into a container below.

Temperature-Proof Oil

Lubricating greases have won battles for the Russians and lost them for the Nazis. Intensive work on the processing of petroleum products by the oil industry in cooperation with Wright Field has made it possible to keep American planes in the air whether the temperature be 70 degrees F. below zero or 120 degrees above. It will no longer be necessary to change the oil in the hydraulic system to suit atmospheric temperatures.

Portable Arctic Shelter

To facilitate engine maintenance in sub-zero climates, a light-weight insulated "Arctic" maintenance shelter has been developed by the Miscellaneous Equipment Laboratory at Wright Field.

The shelter is constructed of plywood frames and specially-treated fabric covers filled with glass fiber insulating materials.

The entire unit can be flown to isolated operational bases where as few as two men can erect the shop on any hard surface, including packed snow or ice.

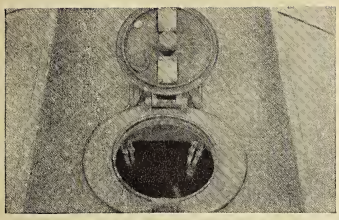
With the new shelter, maintenance crews at advanced bases can make repairs, check equipment and conduct major overhauls on engines under indoor conditions that are second only to permanent shop facilities.

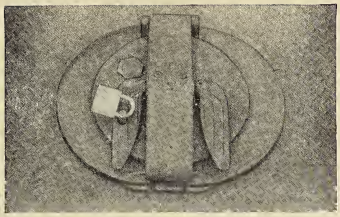
The heaviest of aircraft maintenance machines can be mounted on the insulated flooring of the shelter, which has an interior large enough to accommodate a four-man crew working on an engine.

Floor space of the shelter measures 16 by 16 feet, yet it can be packed into a space 5 by 5 by 6 feet. The rounded top tends to prevent accumulation of snow and minimizes the effect of wind on the shelter.

The shelter going up.

Above: Convos covers the framework.
Below: Reody for occupancy.





At left is the storage hatch open; at right, closed, showing the tamper-proof lock.

Tamper-Proof Fuel Lock

The inexpensive and effective locking device pictured above makes it difficult to tamper with aviation gasoline in mobile fuel units at Pendleton Field, Oregon. Designed by Line Chief, Master Sergeant Sylvan V. Vick of Monroe, Louisiana, the lock may be installed on tank hatches quickly and at small cost. A padlock hooked through a stud riveted to the hatch cover anchors the "butterfly". The cover is held down tightly at all times as it does not unseat until the butterfly has been turned back fully.

But this isn't the first time one of M/Sgt. Vick's ideas has been put to practical use. As far back as 1937-1938, when he was employed by a manufacturer of heavy road grading equipment at Peoria, Illinois (Le Tourneau Co.), he devised a method of applying increased pressure to bulldozer blades—an idea which is helping men in the AAF clear and level airfields now in some of the remotest spots on the earth.

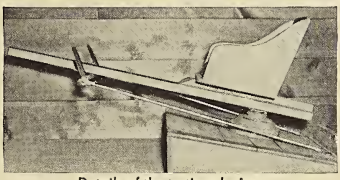
At Pendleton Field, M/Sgt. Vick has developed in his spare time a number of other mechanical improvements which have been adopted and placed in regular use. A hydraulics test bench incorporating a multiple manifold to plug in various sizes of tubing has proved a time saver. The bench likewise includes an expander-tube type hydraulic brake tester of his own design.

Before enlisting October 4, 1940, he had been a mechanic, "catskinner", shovel operator, machinist and welder, as well as shop superintendent of a bridge construction company in Portland, Oregon. The Army first sent him to one of its technical training schools for airplane mechanics.

Later his skill in finding the right way to do a job led to his selection as one of a special school group that suggested improvements in camouflage technique at Fort Dix, New Jersey. And his knowledge of just about every nut and bolt on the Mitchell B-25 resulted in an assignment travelling for the North American Aviation Company, supervising maintenance and overhaul of B-25's at a number of fields.

Rudder Reflex Indicator

Shown below is a device to develop the rudder reflexes of pilot trainees. It simulates, on the ground, the rudder characteristics of a plane in the stall position and the rudder action of a plane during a ground roll. Due to its inherent instability, the operator is required to react immediately with proper rudder action in order to keep the machine on its proper heading. The



Details of the testing device.

photograph shows the machine in its basic form, rigged to simulate a stall condition. The finished product is equipped with a fuselage, has a dummy stick installed, and is rigged for braking action.

Since little study time is given a student to develop his ground reactions in comparison with the time afforded him to develop his reactions in the air, a device was needed to help in the development of the reflxes so that the student would automatically perform the proper rudder action. After considerable experimentation, Major W. I. Fernald, 5th Army Air Force Flying Training Detachment, Hemet, California, designed what he has called the Fernald Reaction Time Indicator. The basic patent is held by Major C. C. Mosley, former employer of Major Fernald.

After sufficient practice on the machine, some students who have never been in the air before are able to execute the entire take-off without assistance. In addition to the machine's value in developing reflexes, it is also used as a means of classifying Aviation Cadet candidates. After a reasonable length of time, those candidates who are unable to control the machine are invariably very slow in reacting to phases of flight involving the use of other controls.

Bombardment Observation Trainer

Out of the Photographic Section of the Roswell Army Flying School, Roswell, New Mexico, one of the bombardier schools of the AAF Flying Training Command, has come a device which is claimed as a valuable training aid to aerial photographers who accompany planes on practice bombing missions. The gadget was fashioned from wood scrap, two pieces of tin, a flashlight, and four incandescent bulbs by Lieutenant David Dunn and Sergeant Roy Holloway after weeks of patient experimenting.

Although daytime estimation of bomb hits is usually a simple matter for the experienced spotter, night performance is sometimes comparable to flying blind and accuracy is the result of many hours of experience in the air.

Sergeant Holloway reasoned that an indoor bombing range should offer all the training advantages of the conventional outdoor type, and, in addition, aid in the improvement of the spotters' aerial operations.

Accordingly, he went about setting up a night target which would be an exact replica of the target seen by the bombing crew from aloft at night. He drilled holes in a section of wooden paneling, 52 inches square, in the form of a target-cross, and then drew lines joining "one o'clock" and "seven o'clock," "two" and "eight," and so on. Along these lines, additional holes were drilled at scaled distances from the center and marked: 300 yards at "one o'clock," 200 yards at "two o'clock," etc.

Holloway then took two oblong pieces of tin, which were shaped in the form of a trough, and attached them to the back of the paneling over the target-cross by means of tape. The tin merely acted as a shade or reflector for the light bulbs, which were inserted in the tin to illumine the target. When the bulbs were illuminated, the night target was completed.

Pieces of tissue paper were pasted over the holes drilled to scale across the face of the panel-target. The holes simulate bomb-craters. When a flashlight glows from behind the paper for a period of two-and-a-half seconds, it resembles the flash of a struck bomb.

The sergeant next constructed a movable eye-piece through which the photographer peers at the target, and visualizes it as an objective 12,000 feet below the photo patch of a bombing plane. The eye-piece may be moved forward or backward, increasing or decreasing the altitude. Since the bomb-burst holes are numbered, and a chart reveals the exact location of the hole, grading the accuracy of the observer is a matter of seconds.

ON THE LINE

WHAT'S WRONG WITH THIS PICTURE?

Here we go again, boys!

The boners pictured here were picked and posed by (left to right) Sergeant C. P. Putman, Technical Sergeant H. W. Stitt and Corporal W. A. Ryan, of Patterson Field, Ohio.

"Mistakes like these may seem funny in a picture," said Crew Chief Stitt, "but they're mighty serious ON THE LINE. Such maintenance boners can do a lot of damage to equipment and injure personnel."

Crew Chief Stitt picked eight maintenance boners here. Do you see them all? Answers on opposite page!

A monthly roundup and exchange of hints for mechs — some old, some new — in the interest of better maintenance.

Do You Know . . .

That airplane maintenance forms are provided for your use when accomplishing any of the required periodic inspections. One master set of the applicable maintenance instruction forms "will be maintained," according to T. O. No. 00-20A, "for EACH AIRPLANE in the back of the form 41B." This includes the following forms:

Preflights and Daily Inspection
25 Hour Inspections
50 Hour Inspections
100 Hour Subsequent Inspections
At Engine Change Inspections
25 Hour After Engine Change Inspection.

A Pertinent Question . . .

One staff sergeant writes in: "Whenever I finish working on a ship, I ask myself: *'Would you fly it that way?'* If the answer is yes, I get a good night's sleep."

Dirt

It's an old saying ON THE LINE that a clean airplane is a good airplane. This applies as well to the inside of the fuselage. Loose objects such as fire extinguishers, soda pop bottles, tools, etc., can cause fouling of the controls as well as injury to personnel. Incidentally, dirt has been known to blow up and get into the pilot's eyes, making it impossible to make an immediate landing.

Conduit Knurled Nuts

Watch electrical conduit knurled nuts that may become loose at a connection. Vibration will wear the insulation from the primary, or any other hot wire, causing a short which can bring about motor, radio or instrument failure.

Mech-Fatigue . . .

You've heard of pilot fatigue but you've probably never stopped to think that long, grueling stretches on the job make you subject to MECH-FATIGUE.

Mech-fatigue—which is the mental or physical let-down from overwork or strain —can result in carelessness, forgetfulness and inaccuracy. Watch yourself on the long work stretches; ask for a break if you feel it coming on. Talk to your line chief; he'll know you're not just goldbricking.

Adequate rest, food, recreation and exercise will help you keep yourself in perfect physical condition and ward off mech-fatigue.

Have It Treated . . .

With medical service available twenty-four hours a day, why wait to have cuts, sprains, and bruises treated? Five minutes spent at the first aid station may mean the difference between a permanently stiff finger and a useful hand.

Pitot Tube Covers

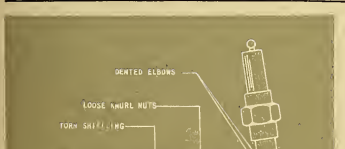
This one happened recently. A B-24 pilot starting down the runway, had gained speed and was just ready to take off when, to his amazement, a glance at the air speed indicator revealed that it registered zero. He applied the brakes, trying to stop before using up all the runway. Luckily for the pilot and his crew, he stopped in a very convenient mud puddle without much damage to the plane. . . . It seems that someone had simply forgotten to remove the pitot cover. T. O. No. 00-20-A, stresses the importance of this inspection.

Watch Yourself . .

Don't make a heavy lift with your knees straight and rigid. Strains may be avoided by bending the knees. Be sure you are physically capable of making the lift before you attempt to do so. Be sure of your footing.

Emergency Escape Equipment

Maintenance of emergency escape equipment is very important. Be sure that emergency escape doors are properly safetyfied and that safety locks are in good working condition and are not corroded. See AAF Regulation 55-2.

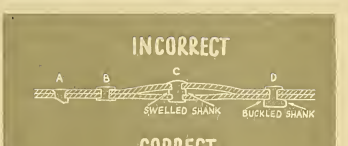


Ignition Cable

Particular attention is called to the damaged elbow in the drawing above. When tightening the elbow nut, the elbow must be held in the opposite direction to avoid squeezing the ignition cable. If thus damaged, the spark occurs at the break instead of at the spark plug. When this condition is noted, cable must be replaced.

Torn shielding causes radio interference. Minor damage can be corrected by silver soldering but if the break is bad cable should be replaced.

The knurl nut should be checked and tightened if necessary.



Riveting

INCORRECT: (A) Unsteady bucking bar; (B) Rivet driven excessively; (C) Separation of sheets; (D) Excessive shank length. These mistakes will cause failure of parts involved.

CORRECT: (A) Bucking bar held firmly; (B) Rivet driven properly; (C) Creeping and distortion of the sheet has been prevented by use of clamps; (D) The upset end of the undriven rivet measured approximately 1½ times the diameter of the rivet from the surface of the material being riveted. Reference: U. S. Army Air Corps Standards Book.

MISTAKES ON OPPOSITE PAGE

Reading from left to right

1. Be careful; that jack pump should be on the wing jack assembly. It's a double hazard on the floor. Someone may trip over it and get hurt, and the shut-off valve, if stepped on and opened, will release the pressure and allow the jack to drop.

2. That knurled safety nut on the jack should be screwed down to the proper position. That's why it's there.

3. If you'd only watch what you're doing, you'd realize that it's bad practice to use a pipe wrench on the oleo strut hex nut. Use the proper socket or box wrench which is listed in T. O. No. 00-30-45.

4. Wait a minute, you in the center! Gasoline in an open container is not permitted inside a hangar; furthermore, carbon-tetrachloride is a much safer solvent to use in the removal of oil and grease from rubber tires. And don't forget that all volatile fluids used for cleaning must be stored and used from safety type containers, according to T. O. No. 01-1-1.

5. It's bad practice to lean the axle on a tire, or anything else for that matter. If it falls, the bushing will be scarred and the axle knocked out of line. The axle should be laid on a bench or flat on the floor and protected by rags.

6. And those roller bearings shouldn't be laying on the floor. They'll collect grit and dirt and will require rewashing to prevent later malfunctioning. Bearings should be protected by rags or placed in a clean container.

7. You on the tire: You should be watching what you're doing, and you SHOULDN'T be sitting on the tire while inflating it. Believe it or not, tires can and have exploded—with serious injury to personnel.

8. And why take unnecessary chances by inflating the tire under a jacked-up plane? There's no rationing of safe hangar space yet.

ANTI-SUB COMMAND

(Continued from Page 6)

However, the Navy and the Antisubmarine Command are careful to evaluate a message before wasting manpower and equipment on what might prove to be a wild goose chase.

The Antisubmarine Command and the Navy are cautious in their evaluation of successful attacks. Pilots say that, to convince their superiors, a plane crew must bring back the U-boat captain's cap.

A squadron of the Command did comply with this rigid test, producing not only a cap, but an enemy U-boat captain himself. Somewhat bedraggled, he was nevertheless convincing evidence. The captain and some of his German crew had escaped in rubber life boats from a submarine bombed by an Antisubmarine Command plane. They floated a couple of days until rescued by American surface craft.

So effective was the bombing from the air of this U-boat, that it was only a matter of minutes before she filled and sank. The Army bomber crew, witnessing the plight of the enemy men on the surface of the water, dropped lifesaving equipment. Two days elapsed before the Germans could be rescued, near death from exposure, by Coast Guardsmen.

Experience has shown that submarine crews fear aircraft. They will take their chances maneuvering with surface craft, but duck under water if they see an airplane in time. And they generally stay under if they know airplanes are in the vicinity.

However, on rare occasions aircraft are fired upon by the guns of the U-boats who then submerge after the plane has passed overhead—if the plane hasn't already done the submerging job. Probably, that captured U-boat captain failed to avoid destruction of his craft from the air because he lacked sufficient time to dive.

THE tough aspect of submarine fighting is the flying day-after-day, in all kinds of weather and over wide stretches of cold, treacherous water. The strain of this sort of work is hard to measure. One pilot has said: "I have more than once found myself making a sudden steep bank out at sea, under the impression that I was avoiding a mountain." Another declares: "One of my friends, shortly before he went on leave, swore he saw a man riding a motorcycle 450 miles off the coast."

The uncertainty of the outcome of an attack is well illustrated by the experience of an Antisubmarine Squadron bombing crew over the Bay of Biscay. A surfaced submarine was sighted by a member of the crew of a Liberator bomber piloted by 1st Lieutenant Walter Thorne of Marietta, Ohio.

As the plane approached for the bomb run, the U-boat started to crash-dive. However, before it disappeared from view, 1st Lieutenant Brent F. Walker of Jefferson City, Mo., attacked with machine gun fire.

The approach on the first run was made from the stern of the submarine. Three depth bombs exploded approximately fifty, thirty and sixteen feet from the stern, while others straddled the conning tower.

Private R. R. Williamson of Austin, Texas, reported seeing a part of the U-boat in the explosion geyser and fired another burst of machine gun fire into it. On a second run, Lieutenant Thorne saw an oil patch, 200 yards wide, spreading from a geyser-like center.

First Lieutenant Irving T. Colburn of Chicago was bombardier. Other crew members included co-pilot James Anderson of Austin, Texas; Staff Sergeant George Fowler of Spartanburg, S. C.; Staff Sergeant Hollander of Indiana, and Technical Sergeants Engles of Hazelton, Pa., L. T. Figg of Crew, Va., and J. Briston of Evansville, Indiana. The Army Air Forces has given credit to the crew for the destruction of this enemy submarine.

In other cases, bodies from inside the submarine have been seen coming to the surface. There is little doubt in those instances that the submarine was destroyed. Often, submarine crews have been rescued from the sea.

Rescues at sea have been effected for victims of lost merchant ships through patrol activities of the Antisubmarine Command. When a storm lashed the waters off Cape Hatteras recently, the 31 members of the crew of a merchant vessel were forced to take to a single lifeboat.

An Antisubmarine Command plane on routine patrol spotted the small craft, which was bobbing helplessly in the mountainous seas. The airplane was piloted by Lieutenant Norman E. Purdy of Hamilton, Ohio, who radioed for aid. A second plane went out, piloted by Lieutenant Ford A. Trotter, Jr., of Luverne, Ala. Emergency equipment, including food, water, clothing and blankets was dropped from the second aircraft.

The Navy sent out a Catalina patrol bomber under the command of Lieutenant Commander Delos C. Wait of Eldorado, Ark., which also dropped emergency equipment. Meanwhile, the Eastern Sea Frontier Command, which had been coordinating the Army and Navy air action at the scene, now sent a fourth plane—a Coast Guard Hall patrol bomber—to scout for aid.

Lieutenant-pilot Edwin B. Ing of Elizabeth, N. J., searched the area and found, about fifteen miles away from the lifeboat, a freighter. By blinker signal he told the plight of the 31 sailors in the small boat and then led the vessel to the spot. All 31 men were rescued.

While rescues of this type are only a by-product of the primary missions of sinking submarines, yet they are an important factor in saving human lives.

Ordinarily, the average air crew untrained in spotting an object in the water will miss seeing something actually on the surface. This happens for a number of reasons. It may be because of the manner in which the surface is scanned, or because of a type of eye fatigue that fails to see what is in the field of vision, or because what is seen fails to register on the consciousness of the person making the observation.

In order to reduce to a minimum these and other factors that tended to make submarine bombing from aircraft in the early days an extremely hazardous undertaking, the Antisubmarine Command has set up a special training program. The proper method of scanning the horizon, the correct manner of dropping bombs and other instruction in tactics and technique are taught by a squadron skilled in the business of tracking down subs.

WHEN the Antisubmarine Command receives pilots, co-pilots, navigators, bombadiers, radio operators, gunners and engineers from Army Air Force Schools, they are immediately given this additional training. From this schooling a new type of combat crew is created which is highly skilled in "giving the business" to enemy U-boats.

The German Navy has declared that it is turning out submarines faster than the sea and air forces of the United Nations can destroy them. However, as new air crews are trained and turned out for battle, the destruction rate of U-boats will undoubtedly have the Axis singing a different tune.

Submarine warfare may be at a turning point. The Antisubmarine Command, in coordination with the Navy and Allied aircraft, is beginning to take the offensive. In addition, the campaigns in Africa and Russia may force U-boats to accept the defensive because of the impelling need for the enemy to interfere with the supply lines. Enemy submarines may no longer be free to go marauding after merchant shipping whenever it is within the range of underwater craft. They may be forced to concentrate their efforts on interference with convoys to Russia, Africa and England. This is an advantage to the Allies—they know where to expect the enemy.

The effect of Antisubmarine Command and Navy operations, at the moment, has been to eliminate enemy U-boats from American coast areas. Thus, the loss of coastal ships and crews due to enemy action has been reduced almost to the zero point.

Close cooperation has been carried on with the British Coastal Command which has the same functions as the Army Air Forces Antisubmarine Command. In a survey published by the New York Times of the two years of operations, the Coastal Command report stated that it escorted 4,947 merchant convoys, attacked 587 U-boats and flew some 55,000,000 miles.

While the record of the Antisubmarine Command does not yet approach that of the sub-sinking component of the Royal Air Force, millions of miles have already been flown and numerous U-boats have been attacked in the short period since its inception. ☆

Guides for Global War

II - Map Projections

By Captain F. I. Burnham

MAPS AND REPRODUCTION UNIT, A-2

IF a pilot could fly high enough and had glasses of sufficient power, he would see the earth's horizon as an arc of a circle.

The portraying of land and water forms on this huge globe has been a problem of major concern to the cartographer for centuries. Airmen observe an indication of this problem when they look down from a plane. Below, the earth's pattern is in proper proportion, but toward the horizon objects become more and more distorted.

If our maps could be drawn on spheres or globes, or, in the case of a small area, even on a segment of a globe, we could then produce maps or charts in their proper relation and proportionate size without difficulty. Unfortunately, however, we must necessarily resort to the use of flat maps to show the spherical surface of the earth.

The problems involved in effecting this transition should be thoroughly understood by the airman. Not only is it well for flyers to know the historical development of the charts they have to work with, but also it is always possible that navigational charts and maps may be lost on a mission. In such a case, knowledge of the fundamentals of map projections will enable a pilot or navigator to make independent judgment concerning the value of local charts which he may be forced to use for the successful

Basic knowledge for every airman on the methods used to chart the earth.

completion of the mission. By general usage, the globe has been divided into sections called degrees. First, we have an imaginary line circling the globe equidistant between the two poles, known as the equator. Then, each of the resulting globe halves is divided by ninety other lines parallel to the equator. The lines represent parallels or latitudes.

The globe next is divided into 360 degrees normal to the equator—180 degrees east and 180 degrees west—by lines representing meridians or longitudes. The prime meridian or point of longitude now in general acceptance is Greenwich (London).

GEOGRAPHERS and cartographers in years gone by used a grid system, starting at the western edge of the known world and numbering the grid in one direction only. (A projection or grid is an orderly system of parallels and meridians on which a map can be plotted.) On most maps an island of the Canary group known as Ferro was the starting point. Some European maps still use Ferro for the prime meridian.

In determining longitude from foreign maps it is necessary to determine the location of the prime meridian since there are many maps published that use a prime meridian other than Greenwich. Generally, the odd meridians are the capitals of countries, as in the case of the Paris meridian used in many maps. In the early days of our republic, our maps were published with the meridian of Washington as the prime.

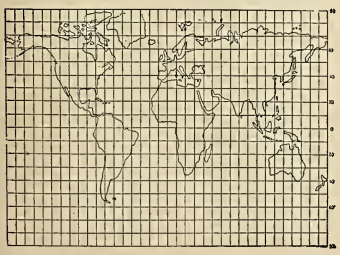
The problem of plotting the characteristics of this earth-globe on a plane surface lies in projecting the relationships of this imaginary grid on the sphere to a like grid on a plane with the least amount of distortion.

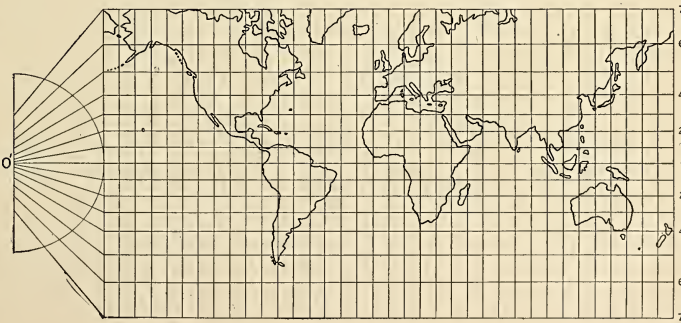
Projection systems may be divided into three general classifications: cylindrical, conical and azimuthal.

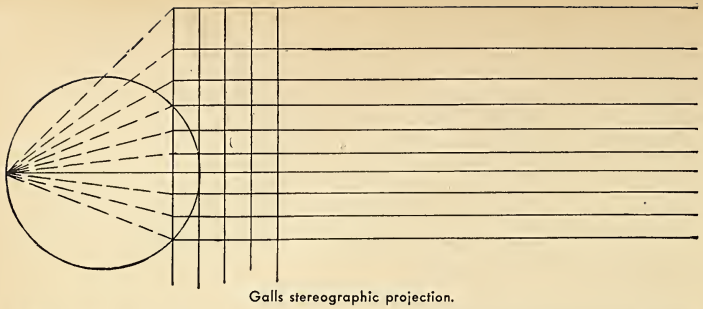
The cylindrical projection is the simplest of the three. It shows the globe as it if were plotted on a cylinder and then flattened out. The cylindrical class may be illustrated by the simplest of all projections, in which the grid is a rectangle with all parallels and meridians spread equally and are represented as straight lines.

One of the best examples of the cylindrical projection is the one devised by Mercator in 1569 and which still bears his name. Like the rectangular projection for

Below is shown a map of the World in cylindrical projection, and at the right is Mercator's version, one of the most familiar of all charts in use today.



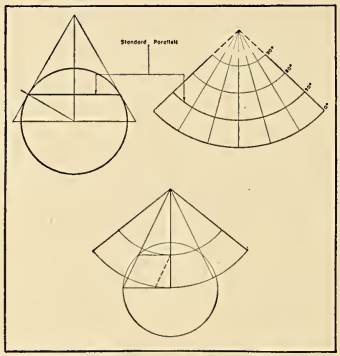




Galls stereographic projection.

a world map, the meridians are spaced off true to scale at the equator but in latitude the distance increases from the equator. The error in measurement of distance also is exaggerated. The scale of the Mercator map at sixty degrees latitude is two times that at the equator. As the distance increases away from the equator—say, to the eighty-degree parallel—the scale is increased to six times that of the equator. It is obvious, therefore, that the poles are unplottable on this type of map.

An example of the misconceptions possible from this type of projection is illustrated in the belief of many people that Greenland is about as large as South America. On an equal area map, wherein Greenland is shown in its proper relation, it is about the size of Alaska.



At top is a simple conic projection, and below is a conic projection with two standard parallels.

A MERCATOR chart is used primarily in plotting courses for navigational purposes. It is one of the most familiar of all charts in use today. Practically all the coastal waters of all lands have been shown on this type of map for many years for use by our merchant marine, navy and private boat owners. With the new importance of air travel, much, if not all, of the land area is being mapped on this type of chart.

Galls stereographic projection also comes within the cylindrical class. This projection is comparable to the Mercator except that distortions are not so pronounced in the higher latitudes. This is due to the projection being constructed by assuming that the cylinder is only as large as the 45th parallels. These parallels being true to scale, those north and south are increasingly exaggerated, and the scale toward the equator is reduced.

Projections of the conical class, like the cylindrical, are devised in such a way that it is possible to develop the plane by "unrolling" it. Only in this case the developed cone will have curved lines of latitude when unrolled and generally straight lines of longitude.

The conic projection is formed by projecting the surface of the globe upon a cone tangent to the chosen latitude. Exaggeration is apparent in both directions from the tangent parallel. An improvement may be noted in a conic projection with two tangent parallels, in which case a portion of the globe must necessarily be eliminated.

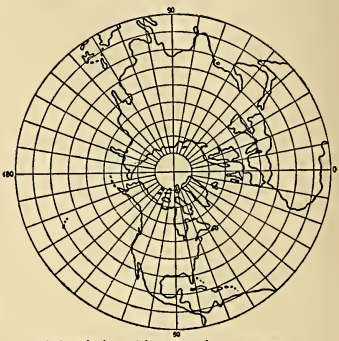
By using a combination of cones, a so-called polyconic projection is arrived at, with less distortion in scale. As in the Galls projection, the scale distortion is exaggerated above and below the standard parallels and is slightly compressed between them.

Conic and polyconic maps have their particular uses in the political maps of small areas and portions of the earth's surface. A good example would be a map of Asia with the least amount of distortion throughout the area. A choice of the conic projection with two standard parallels at 12-58 degrees will fill this requirement. Maps on a polyconic projection are usually set maps of an area at a scale that is impractical to show on one or two joining sheets. They are generally compiled and drawn as individual sheets or maps independently of any other sheet or map adjacent to or part of the completed set. The U. S. Geological Survey topographic sheets are plotted on the polyconic projection.

THE azimuthal class includes projections on a simple plane. Three of the important azimuthal projections are based on perspective, or on the different positions of the eye in relation to the plane upon which the global network is to be developed. In the gnomonic projection the focal point is in the center of the globe. For a stereographic projection, the perspective lies in the antipode, while the focus for the orthographic projection has infinite distance, the projection lines being parallel.

Two other important azimuthal projections, equidistant and equal area, are developed by arithmetical processes.

Probably the best example of the azimuthal charts are shown in the polar projection in which it is desired to show the areas around the poles—or the orthographic maps to show the earth as a whole with the appearance of its being a globe.

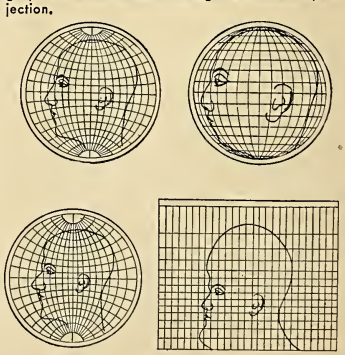


Azimuthal equidistant polar projection.

In explaining the foregoing examples of types and kinds of projections only the principal, and generally, the simpler forms have been used. With these fundamental types as a base, there have been hundreds of different variations of projections invented or designed—some practical and some freaks that could not be used except under exceptional circumstances.

Let us look at some of the exaggerations that are an inherent part of all projections. If we draw a man's head on a globular projection and then carefully plot this head on other projections we see some amusing, if not revealing distortions. This does not mean that the projection on which the head was originally drawn is the best but shows that the distortion is real and not fancied. If the head were drawn on any other projection the results would be equally amusing. The illustration below should show you what we mean. ☆

Below are examples of distortions inherent in all projections. Top left is a head drawn on a globular projection; top right is the same head plotted on an orthographic projection; bottom left, a stereographic version, and bottom right, a Mercator projection.



COMPRESSIBILITY

By Colonel Ben S. Kelsey

PRODUCTION DIVISION, WRIGHT FIELD

Analyzing wave formations in relation to their effects on high speed flight.

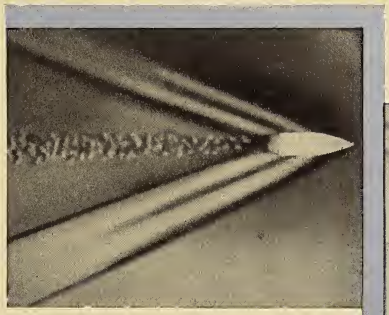
BEATING compressibility would be much easier if we knew more about it and its effect on airplanes. Our aeronautical information, to date, peters out just short of the speeds and the conditions where compressibility becomes vitally important.

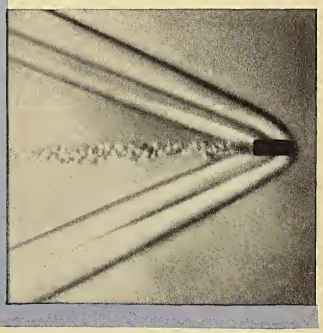
It is true that fluid mechanics, physics and mathematics all can furnish a great deal of helpful information on the nature of pressure waves or surface waves in a fluid, but this information has yet to be applied specifically to aircraft problems. As a result, there is at present a big gap in our knowledge, filled largely with ignorance or guessing on the subject. Much of design is educated guessing anyway, so this is perfectly justified for the moment, but it doesn't help the pilot or engineer a great deal. He inevitably winds up with a hopeless sort of feeling when faced with all the problems now lumped under "compressibility".

It is apparent that beating this phenomenon will be a long struggle, and it is doubtful that any simple solution will permit immediate progress into the "supersonic" region, or even into the region of speed closely approaching that of sound.

In military terms, the first phase of the compressibility struggle will be the reduction of outposts one by one, moving the limits of the region in which we can safely operate farther and farther toward the major obstacle which is now located close to the speed of sound (i.e. speeds approximating 500 to 700 mph.). We are now in that step by step phase. Yet, there are examples of "raids" in the form of high speed dives across the barrier into the supersonic region. These "raids", however are still of an exploratory nature and they give little promise of either safe or continued operation in that region until a great deal more knowledge of the region's character has been obtained.

There appear to be two basic compressibility effects applicable to aircraft. The first develops because the air has to accelerate, speed-up and slow down again to get around objects moving through it. This speeding up of the air particles relative to those farther away and undisturbed goes hand in hand with the reduction in pressure from which we get the major portion of our lift force. This speed-up is a very real factor and adds to local velocities over the skin; these velocities may actually be anywhere from 1¼ to 2 times the average air speed. This means that in some spots on the aircraft speeds are reached which are very close to that of sound, although the airplane itself may be moving at a very much lower average velocity. Thus, the beginnings of compressibility become apparent at Mach numbers of .5, which is 50 percent the speed of sound, and the worst effects are apparently impossible to delay beyond about 85 percent of the speed of sound, or Mach numbers of .85.





These Schlieren photographs show (at left) the flow produced by a sharp-nosed projectile as compared with that (below) produced by a blunt-nosed projectile—both proceeding at a supersonic velocity.

The second compressibility effect applying to aircraft is the typical super-sonic condition in which "bow waves" are actually formed because the initial point of the disturbance (i.e. the entering edge of a wing, nose of a bullet, nose of an airplane or even a break in a contour like the windshield or air scoop) is moving faster than the compression wave which it creates. Then, instead of a smooth fairly gentle wave-front or a succession of wave-fronts moving out head with low intensity, capable of being absorbed by the air particles, we have the object literally tearing through the wave-front and creating a Vee shaped wedge of added pressure with no warning proceeding. This, of course, is the familiar Vee shaped "bow wave" on boats in water or on bullets moving at very high speeds. It can be illustrated by dragging a stick through the water, first at speeds lower than the slight ripples that radiate from it, and then by moving the stick faster.

It is difficult to describe or visualize a "shock wave" forming on an airplane, particularly when it occurs apparently well back on the surface, and apparently without having anything to do with any nose condition. This can be due to the local speeding up of the air over the surface so that when "compressibility speeds" are reached there is no real entering edge. When this occurs there isn't a "bow wave" as such, but there is certainly a disturbance. The disturbance has been called "compressibility burble", which may describe the situation better than the term "shock wave".

One way of visualizing this wave standing out at quite a steep angle from the surface is to imagine a screen or grating having fairly close mesh near the surface and a wider mesh as it gets farther away. Obviously, the more violent the effect, the closer the mesh and the farther it extends from the source of trouble. The shock wave, or compressibility burble, apparently affects the air through which it passes about the way a screen would. It drags along a certain amount of air and causes relatively turbulent flow behind. There is a great deal of energy lost in heating up the air and disturbing it as well as in dragging some of it along.

It is obvious that with the approach of these compressibility effects the drag will

rise sharply. In fact, the only data obtained to date on airplanes would indicate that drag values go out of sight at some speed slightly above 80 percent that of sound. Running out of airplane knowledge, we can jump to bullet data, and here it is found that drag characteristics have been determined for much higher speeds.

In bullets, for instance, the drag at a velocity of between 80 to 90 percent that of sound starts up in the same fashion as in aircraft. It is possible, however, with modification of nose shapes, to control this rise so it not only levels off at a drag co-efficient about twice that when it flew out of hand, but the drag co-efficient actually drops back as speeds are raised to about three times that of sound; and the drag co-efficient eventually reaches values not very much more than when it started its sudden climb. The drag co-efficient multiplied by the functions of speed and size in the normal manner give the actual drag in pounds, which obviously increases as the speed increases. We can design for the actual drag and provide power on a reasonable basis, provided the co-efficient doesn't fly out of hand and leave us faced with unlimited drag and power requirements at some stage along the way.

Since we all tend to believe only what we see, wave formation and travel in air seem too abstract to be real. Perhaps we can revert to another type of wave formation about which we know a good deal more and which, in addition, we can see. The surface waves on water for instance, have considerable similarity to the waves about which we are concerned in airplanes.

If you have ever noticed the water level change in a canal when a boat goes through, it is easy to see that water has to flow past the boat at a very rapid rate in order to fill up the hole caused by the plunger effect of the boat moving between the canal banks. The force that pushes the water back into place is obviously gravity. That is, the boat simply lifts up a hill of water ahead of it, and, when this hill is steep enough, the water runs back between the boat and the canal banks fast enough to match the boat's speed and fill out the hole. It is fairly obvious that a stable condition will exist where the height of the hill is just enough to maintain a steady flow past the boat. Thus, the faster the boat moves, the faster the water has to run and the steeper the hill has to be. One can see the local speeding up of the water by the side, and, if the boat moves at a higher speed, the water will have to run at a faster rate. In other words, the water will have to pick up more acceleration and lose it again in order to get by the boat in the shorter period of time available. If the boat is wider or more blunt nosed it is also apparent that the water has to run faster, too, and needs a steeper hill or a bigger wave than it does for a slim, sharp boat at the same speed. If the boat is operated in open water, the wave effect is again the same, although perhaps less obvious since the canal banks are now replaced by the indefinite mass of water.

The tendency for water to arrive at a uniform level provides an elastic force that varies as the water is raised or lowered. The disturbance of the water level could be considered actually a difference in "pressure" level since gravity or the weight of the water is creating the "pressure" which causes the flow.

Imagine, for the moment, a situation where the particles of a fluid are small elastic golf balls. Moving an object in the center of a mass of golf balls, we could expect that the elasticity of the balls acting together would accommodate for the pressure changes necessary to keep a certain pressure level along the surface of the object. In other words, instead of using gravity as the force providing the hill which causes the flow of the fluid, we would have a pressure hill created where the difference in pressure would cause the same sort of flow.

The situation is not very different from that of the boat in the canal. That is, at low speeds the change in pressure along the surface and the differences in pressure between the region close to the airplane and that some distance from it is sufficient to maintain smooth flow—to give and take as necessary to fit the passage of the plane. The greater the curvature of the airplane wing, or fuselage, whatever it may be, the greater the speed-up necessary to get around and, consequently, the lower the pressure at the surface at that point.

Since this pressure hill depends upon how fast particles close to the object have to move, it is obvious that moving the object very rapidly will produce considerable speed-up, even though the displacement or curvature is relatively small. Here again, a steep pressure hill may be created by reason of the high speed of the object regardless of how gentle its curves. As far as the golf balls are concerned, this is all very well provided the required change in pressure and motion is slow enough so that they can squeeze up and stretch out and speed up or slow down and pass this load on to their fellows in the time available. It is fairly obvious that there is some limiting condition where the time is so short or the blow so hard that the little particles close to the object run out of elastic ability, and, taking up only a part of the load, pass most of it on as a shock to the next layer, which in turn acts like a lot of ball bearings and pass on the major shock. This continues so that the impulse travels on out for some distance as almost a complete shock to each successive layer.

Since the speed at which this shock travels is a function of the elastic ability of the particles of the fluid, it should be possible to determine its value by knowing something of its elastic properties. We find, actually, that the speed at which some such wave or impulse would travel (for instance, the speed of a sound wave) can be calculated actually in terms of the elasticity of the material with which we are concerned. Thus, the speed of sound in air, roughly 760 mph. at ground level, represents an elastic limit for air, beyond which any requirement for change in the air particles is obviously accompanied by a shock impulse with its attendant wave pattern and travel. In passing, it appears that one can almost guess that the colder the air or the golf balls get, the less will be their elasticity and therefore the lower will be the speed at which this shock will travel.

As an object goes through the air, shoving it around, the bigger the displacement, and the lower the speed at which a critical condition is reached where the change required of an individual particle becomes faster than its ability to accommodate and transmit this change smoothly to the surrounding air.

In other words, the steeper the pressure hill which we try to maintain, the lower the speed which we can fly and still maintain flow and smooth contact with the surface and within the elastic limits of the air.

Obviously, at bullet speeds well above that of sound, regardless of pressure hills or pressure gradients, there will be an entrance shock which will vary in intensity only with the size of the nose or the sharpness of the nose. We would therefore expect that in order to keep down the area of the shock, the leading edge should be as sharp as possible.

It will thus be seen that the amount and rate of displacement, the amount of local speed-up and the critical speed at which some shock or compressibility effect takes place, are all inextricably tied up. There are obviously two remedies for the situation: one, reducing the pressure hill slope required so that the speed may be higher before reaching the critical point; and the second, actually designing to fit the wave characteristics. The first postpones but does not remedy the condition, although it may also reduce the intensity of the trouble when it comes.

In boat design, the wave drag of a hull is not only a function of the speed and the weight of water, tied up with the gravity hill, but also one of length of the boat. In other words, the boat must fit the wave pattern which it creates. For this reason there will be a number of speeds which a given length or size of hull of a given shape will fit the complex wave structure to give lower drags than at the speeds in between; if the speed increases for a given length, the drag finally goes up to staggering values.

In other words, even when we can design to fit the wave pattern we reach a critical speed for any given size of boat beyond which it is practically impossible to drive the hull. If a small boat is towed behind a large steamer which has a much higher critical speed, the little boat may be swamped or may become completely unstable or actually plunge under water simply because of its inability to fit the waves it creates. If, however, instead of using a hull

which obtains its support by displacement, we use a hull which upon reaching a certain speed climbs out of the water and planes, a complete new field is opened where waves are formed, but they have much less effect on the boat's performance. The transition, however, it not necessarily smooth, as anyone knows who has ridden in a racing hydroplane or even a flying boat getting up on the step and coming back down.

Perhaps there is some clue to aeronautical problems in this, now that we are reaching speeds where waves are formed. We are vitally concerned with reducing the intensity of such waves, but we have not yet started to design for actual wave conditions. It is probable that we can design aircraft for wave conditions in which we either fit the aircraft to the waves, or in which we make waves and then build aircraft which will operate without being too badly affected by such waves.

Applying all this to the present airplane, it can be readily seen that today's problem is one of avoiding steep pressure gradients or pressure hills so that the limiting velocities for wave formation are as high as possible. Sharp entrances and thin sections may not be the answer since the transition from one point to another along the surface may be too abrupt for good characteristics, and obviously a sharp point is good only for exact head-on motion. A moderately rounded entrance will give the best compromise, but the curvature immediately back of the entrance must have a very gradual change in curvature. During the transition period, at speeds close to but below that of sound, there will be little to choose from in the build-up of drag between various entrances and curvatures, but if the air is displaced too roughly the effects will be felt earlier. At speeds definitely around that of sound or above, the effect of easy entrances and gentle changes is very pronounced. ☆

This is the third in a series of articles on compressibility. In a later issue, the phenomenon as it applies to aircraft will be discussed.

ANSWERS
to Quiz on Page 14

1. (b.) The Solomons. 2. (d.) Fragmentation. 3. (b.) The speed of sound, which is 1,090 feet per second standard air, decreases with a drop in temperature. 4. (c.) Link Trainer. 5. (c.) Two planes, the B-26 and the P-47. 6. (d.) Pops to an exaggerated position of attention. 7. (d.) Single engine, one-place fighter. 8. (b.) Okay or message received. 9 (d.) Two planes, the P-38 and the P-39. 10 (b.) Chicopee Falls, Mass. 11. (c.) Give a soft salute. 12. (b.) A belt of calm moist air centered near the equator. 13. (b.) Continue to eat unless addressed. 14. (d.) Eleven. 15. (b.) Carbon dioxide. 16. (c.) A Russian fighter plane. 17. (a.) Maj. Gen. G. E. Stratemeyer. Maj. Gen. Weaver is head of the Technical Training Command, Maj. Gen. Yount, The Flying Training Command and Maj. Gen. Echols, The Materiel Command. 18. (c.) Bristol Beaufighter.

STREAMLINING AAF TRAINING

By Captain Purnell H. Gould

SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

MOST officers and enlisted men of the Army Air Forces have used in one form or another the services of TAD (Training Aids Directorate), which is part of the new School of Applied Tactics at Orlando, Florida. But it is quite likely that many do not know the extent of the job this organization is doing under the Air Forces' policy of streamlining its training.

In a global war it's learn and live.

Good soldiers must be students in this war which is being fought on more far-flung battle fronts than any previous struggle and with equipment employed in ways often only dreamed of heretofore. This is true in all Army ranks from general to private and in all branches, but nowhere more than in the Army Air Forces.

All who wear the wings and propeller of the Air Forces spend a large part of their time in school. Students and even instructors must learn a lot in a very little time. To help them is the major job of TAD.

TAD is responsible for coordination and approval of the field and technical manuals and other training literature used as texts, for training films, film strips, training posters, visual instructional material, recognition material, and synthetic devices required by organizations of the Air Forces.

Naturally, TAD doesn't initiate and produce all this material itself. Decentralization in the Air Forces has been approved so that each command may develop its own training aids if it can and wishes to do so. But AAF Regulation No. 50-19 provides that TAD will approve and coordinate the development, production, distribution and use of all training aids, and will eliminate duplication of effort in their production among Air Force organizations.

Combat efficiency, the ultimate test of all armies and of their field units, is largely determined by training. In a war which will not wait, practical aids to speed up the training process are vital. These aids range from the simplest gadgets to the most complex mechanical devices, from brief training circulars to detailed technical manuals, from film strips of a few frames to training films of several reels. Available aids are listed in Field Manual 21-6 and in catalogues distributed by TAD. Many of the most valuable and interesting training aids have been placed in classified categories and, hence, cannot be described here.

To supply such aids, TAD has been staffed by experienced officer and civilian personnel. TAD officers who came from civilian life were writers, film production chiefs, newspapermen, artists, engineers, lawyers, educators, research experts, and others skilled in allied fields. In addition, there was a nucleus of training literature officers who came from the Air Corps Tactical School and the Directorate of Individual Training.

It is of incidental interest that TAD has been the continuing thread connecting the present School of Applied Tactics with the earlier tactical schools at Maxwell Field and Langley Field in the years following World War I.

TAD is now operating with several divisions, among which are Training Films & Film Strips, Recognition, Synthetic Training Devices, Training Literature, and Research and Library.

(Continued on Next Page)

To facilitate the production and distribution of training aids, TAD recently sent liaison officers to the Headquarters of the Flying Training Command, Technical Training Command, Air Service Command, Material Command, and the four Air Forces in the continental United States.

The procedure to follow in obtaining training aids already prepared or in initiating new projects varies with the types of aids desired.. The methods, listed according to types, follow:

Recognition Materials

Army Air Forces activities within the continental United States desiring recognition materials, should communicate directly with the Commandant, Army Air Forces School of Applied Tactics, attention: Training Aids Directorate. Inquiries concerning materials supplied automatically should be directed as above. Projectors, lens, slides, screens and printed material for flash recognition courses are being distributed to trained instructors. Also available are sets of plastic and cardboard models of friendly and enemy aircraft, and sets of silhouette posters.

Synthetic Training Devices

Requests for synthetic training devices already developed, or copies of the new Army Air Forces Synthetic Device Catalogue should be referred to:

Commandant, Army Air Forces School of Applied Tactics, Orlando, Florida. Attention: Training Aids Directorate.

Developments may be undertaken locally for minor projects. Projects requiring extensive mechanical and technical development will be referred by TAD to the Materiel Command or other agencies.

Training Films and Film Strips

Instructors requiring Training Films and Film Strips will find titles listed in the Army Air Forces Training Film and Film Catalogue published in February, 1943. Training film libraries are maintained throughout the Army Air Forces.

To initiate new Training Film and Film Strip Projects, request should be submitted to TAD, AAFSAT, through the Directorate's liaison officers. Enough information should be given with the suggested title to permit comparison with materials already in preparation, to avoid duplications.

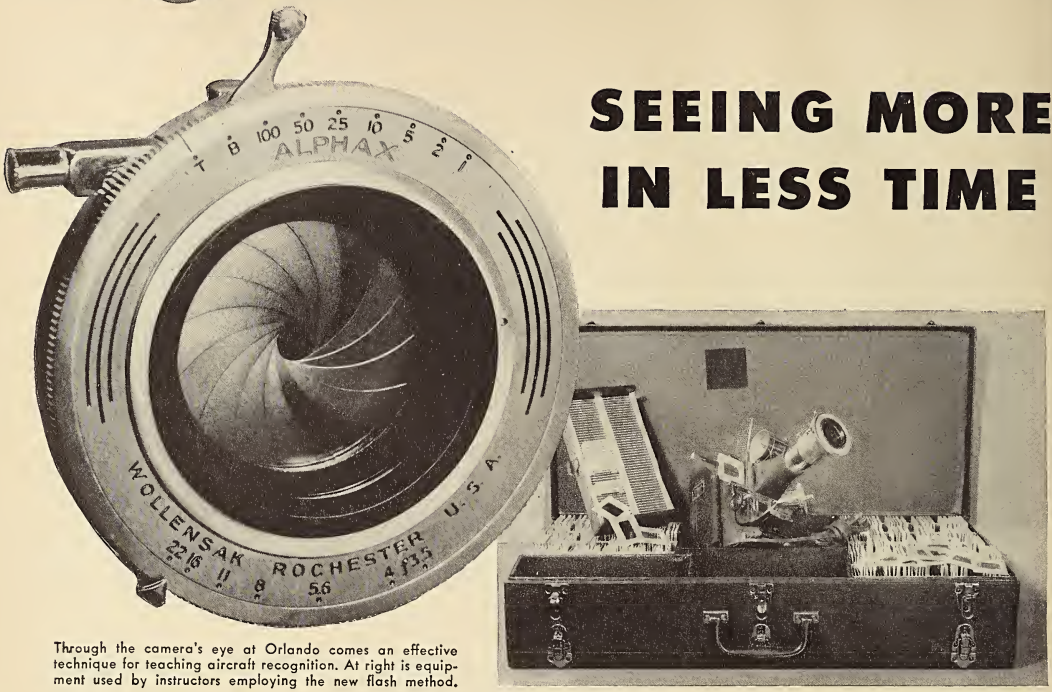
Training Literature

Requests for new training literature, or revision of any existing training literature (War Department publications), should be submitted to TAD, Army Air Forces School of Applied Tactics, through the directorate's liaison offices. To expedite action, it is desirable that a rough draft of the new training literature proposed, or the revision suggested, accompany the request.

War Department publications can be obtained through the usual distribution channels from the Adjutant General's Office. Troop School course materials and extension courses are requested directly from TAD, AAFSAT. Information on other Air Forces' Training Literature may also be procured from this office.

GET 'EM AND USE 'EM!

SEEING MORE IN LESS TIME



Through the camera's eye at Orlando comes an effective technique for teaching aircraft recognition. At right is equipment used by instructors employing the new flash method.

By COLONEL LAWRENCE J. CARR
SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

THE best trained pilots and gunners flying the best planes and firing the best guns will not win air battles or support ground troops or defend our installations against attack unless their efforts are used against the enemy.

This war has taught us that many valuable aircraft and the lives of fine pilots have been lost because there has been too much tendency to shoot at anything and everything which comes within the sights of air and anti-aircraft guns, and to worry later about what was hit. Thus, the need for instant and accurate recognition ability among our pilots, gunners, bombardiers, navigators and much of our A-2 personnel.

Until recently there had not been in the Air Forces an interesting and effective system of teaching recognition. There were numerous methods used, but they were mostly haphazard and uninteresting. Now a standardized system has been approved by our Commanding General and is being initiated throughout the Army Air Forces.

A school for instructors has been operating at the Army Air Forces School of Applied Tactics, Orlando, Florida, and graduates of this course have been sent to installations of the Air Forces. Their mission is to teach the instructors who will teach students in this country and personnel now on duty in the theaters of operations.

The Army Air Forces Method of Recognition Training now being used has been devised in conjunction with the United States Navy and personnel of the British Army. It is a definite, precise and stimulating method of aircraft recognition. Original steps in developing it were taken by the United States Navy in conjunction with the Psychology Department of Ohio State University headed by Dr. Samuel Renshaw. Dr. Renshaw had been conducting many experiments in the study of perception of form. His method was developed originally to increase the rate of reading, and Dr. Renshaw, realizing the importance of his research to the Armed Forces, offered his system to the United States Navy. The Navy made a thorough investigation of the Renshaw System to the extent of trying it out in pre-flight schools. They made an actual check on the effectiveness of the training by having students from the Renshaw training classes identify planes flying in various positions and altitudes. The training was found to be more than 80 percent effective and was adopted as the Navy recognition system. The Army Air Forces has taken the Navy course, incorporated suggestions by the British and applied certain practical considerations into the adoption of the present system.

The objectives of the new course of instruction are: first, to identify aircraft, surface craft and ground vehicles quickly and accurately; second, to count quickly the number of objects in a field of view to an accuracy of close approximation; and third, to improve the general effectiveness of vision.

IT must be emphasized that this training is for the development of a special skill, and that this skill reaches beyond purely informational type of identification training. The latter teaches some identification by the use of photographs and silhouettes, but gives the student insufficient skill in recognition.

The act of spotting and distinguishing between enemy or friendly objects is no longer referred to as identification, which might be loosely described as putting together in one's mind the various parts of an object to discover its identity. This spotting and distinguishing is known as recog-

nition—that form of memory in which the subject instinctively feels that a present object has been known before. Of course, identification is a vital part of recognition training, but knowledge of identification characteristics without the visual alertness to use it is of little value. The Army Air Forces program recognizes this and directs attention to the general improvement of visual acuity; that is, ability to see more effectively in shorter time.

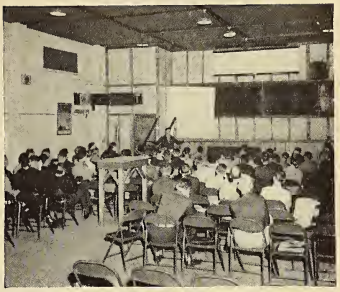
The first objective of the course, the recognition of aircraft and other items, is accomplished through the use of projected images flashed on the screen at split second intervals, varying from three seconds to $\frac{1}{75}$th of a second, depending on the object presented and the progress of the class. This forces the student to see the image as a whole rather than as a series of parts to be analyzed individually. Stress is constantly placed on viewing objects as unified, integrated entities. In the case of each item, the rapid recognition training is preceded by a short instructional period in which the identification characteristics of each item (plane, ship or tank) are presented by a verbal introduction following a standardized procedure and under definite set conditions.

The second objective of the course, quickly estimating a number of objects, is accomplished by the use of projected images showing the objects in varying numbers and concentrations. These are also flashed on a screen at split-second intervals, forcing the student to estimate the number of objects shown. This ability is definitely a skill and can be developed only through continual practice.

The third objective, improvement of the general effectiveness of vision, is the basis of the entire course. It creates in the student an alertness born of ability and confidence. Practice in seeing digits is used to increase the span of vision. It has been found that training in seeing timed exposures under set conditions produces greater results than continued exposures. In other words, you can actually see more in less time. The set condition is the preparation of the student for the appearance of the image, which produces a psychological effort on his part to see accurately and quickly. Hereafter this reaction will be automatic.

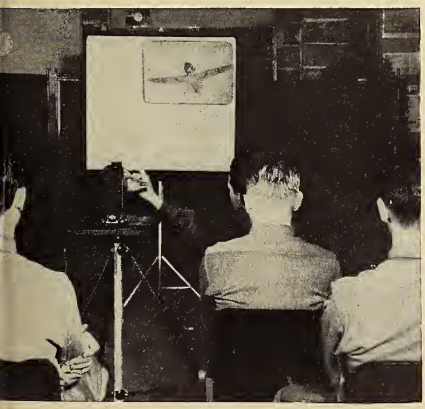
THIS method of teaching is very effective in keeping interest. Recognition becomes a game and a contest. Students take pride in increased ability to recognize types at high speed. In fact, during the classes at the School of Applied Tactics, students were found to be making bets on their ability to spot planes at $\frac{1}{100}$th of a second. They were found also to be very eager to operate the projector while their fellow students did the spotting. These were the same students who a few weeks before felt maligned when informed of their assignment to identification which to their mind was a dull subject. This flash method of recognition, by eliminating the boredom attached to previous methods of teaching, will be welcomed by instructors, students and operational heads alike.

The Air Forces Method is not a short cut to recognition but a means of acquiring greater proficiency in recognition if properly carried out. The more time that can be devoted to recognition training under this method, the more proficient will be the student. Any time that can be allotted to recognition training, no matter how short, can be utilized; but the number of objects learned and the proficiency acquired will depend upon the time available for training.



Instructors learning to instruct.

There is no substitute for study, and in order to recognize aircraft a student must be thoroughly acquainted with each type. To supplement slides and all visual presentations, models, posters and manuals will be distributed. A recognition manual prepared in conjunction with the Navy covering aircraft, ships and ground vehicles, is now on the press. This manual will contain photographs and silhouettes of aircraft in flight covering the operational types of friendly and enemy aircraft, together with a brief description of pertinent facts on each plane. This recognition manual, which will be kept current along with all other equipment necessary for the teaching of this course, will be coordinated by the Training Aids Directorate, a part of the Army Air Forces School of Applied Tactics, Orlando, Florida. ☆



Whatizit . . . at 1/100th of a second?

Each slot holds the photo negative of a warplane.

BATTLE REPORTS

(Continued from Page 5)

roughly four ship elements, all elements flying ships in trail. I got shot at one "Oscar" but did not observe results; pulled up to left, saw one P-38 going down with three Japs on his tail. I came down on them, fired at last "Oscar", firing from 300 yards until I went over him. Side of fuselage behind his cockpit blew away.

When I pulled up after second "Oscar" in this group, fired short burst from 300 yards and broke away because another ship on my tail. I pulled up to the right and as I climbed, got shot at flight of three passing overhead from range of 150 yards. Results unobserved. Fell off on left wing and dove on two below so I changed to lead ship, fired long burst from 200 yards, followed him as he dove. He dove into water—no smoke, no fragments.

I was out of ammunition so came home. Landed 1230, got new ship, returned; no sightings, returned to field. Landed 1315.

"Spun into water . . ."

To —— on intercept, identified four B-26s to —— and arrived 1155, 18,000 feet to 15,000 feet. Saw aircraft to left, chased, identified as P-40s. Back to ——, circled, saw aircraft over short at ——. Three Zeros 5,000 feet. My flight position. Zeros broke formation, right ship peeled off to right, center ship rolled, left ship peeled off to left and down; I followed left ship in turning dive. I fired long continuous burst at range of about 500 yards closing in to 50 yards. Zeros left tail assembly came off as he pulled out of dive, and he spun into water one-half mile offshore. I pulled up, couldn't find my flight so joined up with another flight. Patrolled; flight ordered home 1255, landed 1320. No damage to my plane; combat lasted from 1210 to 1215.

"Observed an explosion . . ."

Arrived Buna 1210, 18,000 feet. Saw three Japs about two miles south Buna, altitude unknown. Flight made circling dive to right, approached "Oscars" from their right near quarter. I did not fire on first diving pass, but I pulled out just below level of "Oscars" and fired at one ship just below me and 300 yards ahead. I got in five short bursts. He turned to right and as I passed he went into a fifty degree dive and disappeared. I turned to right and climbed to evade another "Oscar" which was diving at me. After this, I saw no more enemy ships within range. I circled, started after two aircraft which turned out to be P-40s; chased two more, also P-40s, and then came home alone after Wewoka ordered all fighters home. Left Buna 1200, landed 1330. Combat lasted from 1215 to 1245. I observed an explosion at the place the "Oscar" I fired at was diving toward about half way between the ocean and the west end of the Old Buna Strip, and request investigation to confirm a probable victory. ☆

Roll of Honor

(Continued from Page 19)

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* Posthumous.

How to Keep Well in the MIDDLE EASTERN THEATER

Brigadier General David N. W. Grant
THE AIR SURGEON

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

THE following article is the fourth of a series on health conditions in the various theaters of operations.—THE EDITOR.

THE LEVANT, frequently called "The Near East" or "Middle East", is made up of the Moslem countries of Southwestern Asia that border, for the most part, on the Eastern Mediterranean Sea, the Red Sea, and the Persian Gulf. Although it is one of the oldest inhabited regions of the world, it is still a primitive land when judged by American standards. There are several modern cities along the Mediterranean quite similar to American cities, but the great majority of the towns and villages are exactly as they were in Biblical times.

The inhabited areas are found where the most water is available, such as along the eastern Mediterranean seaboard, in the river valleys and in the Lebanon Mountains. The greater part of the area is arid desert land, not great sandy wastes like the Sahara in Africa but flinty, harsh, monotonous desert, covered only with a thin scrubby vegetation.

The fact that the majority of the people live along water courses indicates the important role that water plays in their lives. However, they have little regard for the purity of water. American troops, who have been taught the importance of chlorinating or boiling water before using it, will be shocked to see natives take water for drinking purposes from open ditches running through the middle of the streets. Except for water treated under the supervision of Army personnel, the water in this area must always be considered potentially contaminated with various organisms capable of causing such diseases as typhoid fever, dysentery, schistosomiasis and, perhaps, cholera.

The principal health problems for troops in this area will have to do with the procurement and the use of water. All personnel going to the Levant should know one or two emergency methods of purifying drinking water (FM 21-10).

A man can get along on one quart of water a day for four or five days without any serious consequences if he knows how to husband it. There are a few tricks that will help conserve water when the amount is limited. Drink water only in small amounts and drink it slowly, for when it is consumed rapidly it is lost in the form of excessive perspiration. Small sips swished around in the mouth will alleviate the first craving for water. Chewing gum will also suppress the desire to drink. However, chewing tobacco or smoking have the opposite effect. Unless absolutely necessary, do not allow yourself to become so warm that you perspire profusely.

DURING the summer months the climate throughout this entire area, with the exception of mountain regions, is torrid. Sun stroke and heat exhaustion will therefore be common, unless special precautions are taken to avert them. Every man should know the early signs of these conditions, for it is easy to prevent them if recognized early.

Impending sun stroke is signaled by headaches, dizziness, irritability, dry, hot skin, and the seeing of objects such as red and purple spots before the eyes. Sun stroke victims run a high fever and unless immediate steps are taken to reduce the fever death may occur. The victim should be placed in the shade when possible, his clothes removed, and water given him slowly in small quantities. Sponge the body with water, but do not dry it, for evaporation is a means of cooling. These people should always be taken to a medical officer as rapidly as possible.

Muscular cramps and pale, moist, cool skin are signs of heat exhaustion. The victim becomes dizzy and not infrequently vomits; his pulse is weak; the pupils of his eyes dilate, and his respiration is shallow. Men suffering from heat exhaustion are in need of salt, which should be given in large quantities dissolved in small amounts of fluid, such as water, tea or coffee.

One of the most important disease problems in the Levant is malaria. Although a great part of the country is desert, malaria accounts for a large proportion of all deaths. Malaria-carrying mosquitoes are found wherever there is water, along the sea coasts, in the river valleys, about the lakes, and even at desert oases and waterholes. In parts of Palestine attempts have been made to eradicate mosquitoes. However, throughout the Levant troops should always be aware of the existing danger and govern themselves accordingly. Stay indoors after dark, or if you must go out at night, wear long trousers tucked into boots or leggins, and long sleeved shirts. Use mosquito repellents, headnets, gloves and mosquito boots. If buildings are not well screened be sure that you always sleep under a mosquito net. Avoid native towns where infected inhabitants act as reservoirs of the disease. These villages are usually infested with mosquitoes.

Although yellow fever has never occurred in this area, the yellow fever mosquito is very common and transmits Dengue, or Breakbone fever to man. Dengue is not a fatal disease but is very incapacitating and painful. The presence of this dangerous mosquito is of considerable importance. Strict regulations with regards to Air Corps fumigation and vaccination of all personnel are a result of its prevalence.

Except for the European communities of Palestine and the few Westernized Moslems, the majority of the people have little interest in personal cleanliness. Many of them have scabies and are infested with lice. Because typhus fever and louse-borne relapsing fever are not uncommon, especially during the winter months, it is important to avoid native homes, dirty natives in bazaars, association with individuals who may be infested with lice. Shawls, rugs and clothing, purchased at native bazaars, or

picked up in native homes must be considered as lice bearing.

Due to the scarcity of water, it may be difficult to bathe frequently. However, regular bathing, if no more than a sponge bath, is essential. The skin folds, between the toes, in the crotch, and armpits must be kept clean in order to avoid fungus infections, such as dhobie itch and athlete's foot. After bathing, all parts of the body should be thoroughly dried and dusted with powder, such as the army issue foot powder, and clean dry clothing put on when possible. Do not use another person's towel or allow him to use yours.

Bathe whenever you can, but remember that the streams, irrigation ditches and ponds along the coasts and great river valleys are contaminated with the flukes—blood worms—that cause schistosomiasis, a very serious disease of the bladder and bowel. It is not safe to swim or even wade in water that contains these flukes. Be sure that water has been examined by Medical Department personnel and declared safe before swimming, bathing or wading. Sea bathing close to shore, where there are no sharks, but away from the outlets of rivers, is safe, as is water that has been placed in confined spaces and allowed to stand for from 48 to 72 hours.

TAKE a page from the old cavalrymen's rule book and shave only in the evening for the sun and wind burn a freshly-shaven face.

Flies will be very obnoxious pests in all of the Moslem countries. Few precautions are taken to see that human excrement and garbage—fly-breeding material—are properly disposed of. Not infrequently streets, and even homes, are soiled. This will be immediately evident to all newcomers, for the stench that is found in most Moslem towns is one not to be forgotten. The fact that flies can transmit typhoid fever, bacillary, dysentery and cholera, makes them doubly important. The first two diseases are always present in the Levant, and just because a native can drink water from a ditch that acts both as a water main and a sewer, without particular harm to himself, does not mean that you can. Your typhoid fever shots protect you to a reasonable degree against this disease, but the number of bacteria that might be taken in in one small sip of polluted water might be capable of overcoming your immunity. Then, too, it protects you only against typhoid and not against the other intestinal diseases. There is little cholera in the Levant at the present time. However, the constant immigration of Moslem pilgrims to Mecca from those parts of the world where cholera is endemic makes it a potential threat.

The natives also have the unsanitary customs of fertilizing fruit and vegetable gardens with human waste, and of irrigating and washing fruits and vegetables with sewage water. This, of course, means that these foods can be contaminated with dangerous bacteria. To be sure they are safe, they should be dipped in boiling water for a few minutes before being peeled. Potassium permanganate solution is not satisfactory unless the fruit or vegetable is allowed to soak in it for a minimum of four or five hours. All foods, other than thick-skinned fruits, should be thoroughly cooked. The best safeguard is to eat only at the Army post, even when on leave, or in European restaurants that have been inspected and approved by an American medical officer. By all means, do not buy food from a street vendor.

Milk should always be boiled, for pasteurization is only employed in the modern Jewish communities and a great majority of the dairy animals have tuberculosis and undulant fever. Because food spoils rapidly in this area, it is necessary to carry such staple food as concentrated rations, canned fruit juices, crackers and thick-skinned fruits on an operational flight.

Sand fly fever is a disease very much like dhengue in that it is rarely fatal but very painful. The troublesome little fly that causes this disease is found throughout the Levant. There are many ticks in this region that carry the tick-borne type of relapsing fever. During the last war a large epidemic of tick-borne relapsing fever appeared amongst people who had been living in caves, a frequent habitat of ticks. Some ticks in this area also carry a disease somewhat similar to but milder than our own Rocky Mountain fever — Fieve-boutenneuse. When operating in tick-infested country the body should be gone over thoroughly at least four times a day to be sure that no ticks have been picked up. A tick should never be yanked off, but should be removed with forceps or, if they are not available, by wrapping a piece of paper or cloth about the tick before gently pulling it off. A drop of kerosene on a tick will make him release his hold promptly, or, if nothing better is available, you can prod him with a lighted cigarette butt.

There are many dangerous snakes in this area, such as the black cobra, and pit vipers. To avoid being bitten, examine clothing and shoes before getting dressed, for on cool nights snakes like to get in warm places. Always be careful to look in cupboards, drawers, and other dark places before reaching into them with your hand. Before getting out of bed at night turn on the flashlight to make sure that there are no snakes on the floor. Wear boots when required to walk in snake infested areas and avoid careless touching of trees and shrubs. Do not lie down in the grass until you are sure that there are no snakes about.

IF bitten by a snake, immediately apply a tourniquet above the bite. Do not become excited, and, above all, do not take any alcoholic drinks. A snake-bite patient should not be allowed to exert himself but should be removed to a medical officer as rapidly as possible. If a medical officer is not available, whether or not the bite is on a part of the body where a tourniquet can be used, a cross incision, one-half by one-half inch, should be made over each fang mark and preferably one to connect the two fang punctures. The cut must be deep enough, one-fourth to one-half inch, to insure free bleeding. Suction must then be applied for short intervals for at least one-half hour. This may be applied by the mouth, or by heating a bottle and placing its mouth tightly over the wound. The cooling of the bottle will produce considerable suction (FM 21-10). If possible, kill the snake and take it to the medical officer for inspection, so that he will know what anti-venom to use.

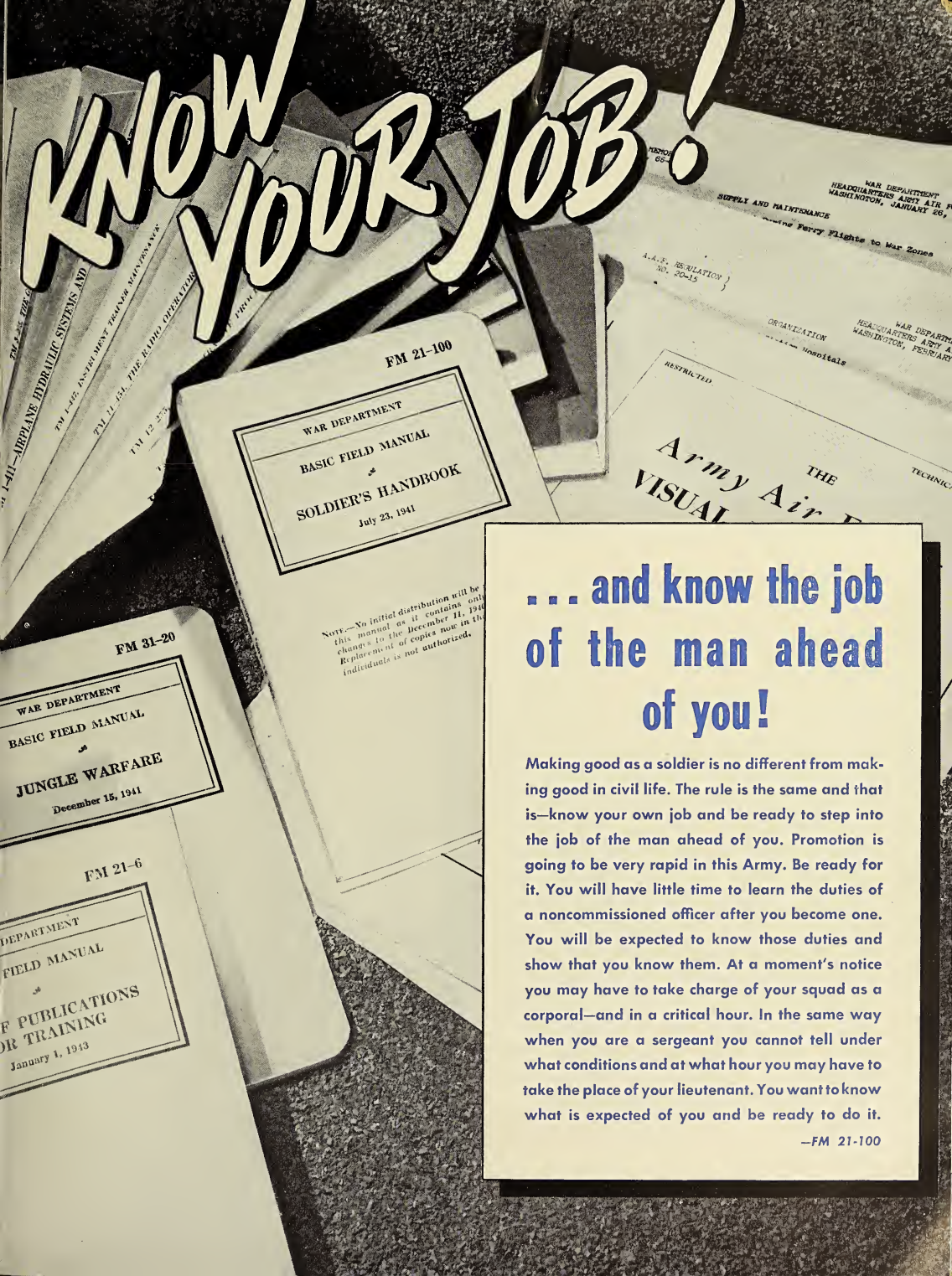
The differences between ground and air temperatures during the summer months, when temperatures of 100 degrees or more are frequently reported on the ground, while temperatures of 40 or 50 degrees occur at relatively low altitudes, make an additional problem for the flyer. Unless he is careful to arrange his flying equipment so that varying degrees of warmth may be added as he ascends, he will become chilled and may develop a cold or even pneumonia. Precautions must be taken to avoid sunburn, for in this latitude serious burns may be acquired after relatively short exposure. The glare of reflected light from the desert and mechanical irritation produced by wind and blowing sand makes it necessary for all personnel to wear protective goggles.

If forced to travel on foot across the desert avoid doing so during the heat of the day, but travel only at night or in the early morning and late afternoon. Avoid unnecessary steps before setting out for a new objective. Be sure you are properly oriented and that your course follows the easiest route. Travel light, take only such things as water, food, compass and gun, first-aid kit, sun glasses, a knife and some cloth, such as a piece of parachute silk, to be used as a sun shade during the heat of the day.

Minor wounds, such as cuts and abrasions, become infected easily and not infrequently develop into seriously disabling injuries so that immediate first aid treatment should be applied to all cuts, burns, abrasions and insect bites—no matter how small. Desert sores and other painful skin ulcers will be avoided if proper attention is given to all minor injuries.

Venereal diseases are common throughout this area, especially in the towns along the sea coast and in larger cities.

Usually, professional prostitutes live in segregated districts. However, all women who can be "picked up" must be considered in the same category as professional prostitutes, and furthermore, they will all be infected with one or more of the common venereal diseases: syphilis, gonorrhea and chancroid. The customs of the country and the religious beliefs of the Moslems forbids the association of their women with members of the Christian faiths. To violate these customs is to invite the most severe type of reprisal from the Moslem men—even to the point of emasculation of the offender. ☆



. . . and know the job of the man ahead of you!

Making good as a soldier is no different from making good in civil life. The rule is the same and that is—know your own job and be ready to step into the job of the man ahead of you. Promotion is going to be very rapid in this Army. Be ready for it. You will have little time to learn the duties of a noncommissioned officer after you become one. You will be expected to know those duties and show that you know them. At a moment's notice you may have to take charge of your squad as a corporal—and in a critical hour. In the same way when you are a sergeant you cannot tell under what conditions and at what hour you may have to take the place of your lieutenant. You want to know what is expected of you and be ready to do it.

—*FM 21-100*


We Who Are Leaving Say...
don't tell when we're going, where or why–
IF YOU TALK–
WE MAY DIE!

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

MAY 1943

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AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

May Brief

IN SPRING many an airman's fancy turns to the North Atlantic Route. We can't call it a young man's fancy, for chances are the spring thaw means more to the old-timers. So this issue we give you straight-from-the-shoulder advice on hopping the North Atlantic from veterans who have crossed the big pond many times.

These men are civilian pilots of the Air Transport Command who cut their eye teeth at Army and Navy flying schools many years ago, piled up thousands of miles with the commercial airlines before the war, and now shuttle big DC-4s and Stratoliners all over the globe.

Our article deals in the lessons they've learned from the "hard knocks" school of ocean flying, presented in what amounts to a round-table discussion on the subject written by Captain Robert B. Hotz, also of the Air Transport Command, and formerly of the AIR FORCE staff. The article appears on Page 6.

THE NEW ORGANIZATION of the Army Air Forces is covered in this issue, first in a statement about its basic principles, on Page 2, by Major General George E. Stratemeyer, Chief of the Air Staff, and in a revised organization chart of the Air Forces on Pages 20-21. The chart carries the names of key personnel as of March 29, effective date of the reorganization.

Speaking of the reorganization, the April issue, prepared before its completion, carried an article explaining the functions of the Directorate of Photography. Under the reorganization, it ceases to be known as a directorate; its functions now fall in with the units headed by Assistant Chiefs of Staff for Training, and for Operations, Commitments and Requirements, respectively. We have tried to catch up with the reorganization in the May issue. But if you spot something that doesn't jibe exactly with the new setup, we hope you'll understand.

SNOW, SAND AND SARONGS is just another way of referring to the arctic, desert and tropics, and it is the name selected for our newest department, introduced this issue. Snow, Sand and Sarongs is prepared by the Arctic, Desert and Tropic Information Center, Eglin Field, Florida, and contains miscellaneous bits of practical information on conditions in non-temperate zones. Suggestions, contributions and requests from the field will help greatly in its preparation each month.

U-BOAT HUNTING is featured in an article on Page 4 which sums up the tactics being employed by our Antisubmarine Command in aerial warfare against the subs. Author of the article is Captain Harold B. Ingersoll of the A-2 section of the Command. Accompanying pictures illustrate the action which takes place from the sighting to the sinking of a U-boat by depth charges.

WITH HIS FINAL ARTICLE on compressibility, which will be found on Page 12, Colonel Ben S. Kelsey sums up present knowledge about this perplexing topic and lifts the veil on tomorrow's possible developments in aircraft design. Clouded as the problems of compressibility admittedly are, progress is being and will continue to be made in overcoming its effects, the Colonel concludes.

PRECISION BOMBING is graphically illustrated in a series of aerial photographs on Pages 9, 10 and 11. The photos were all taken from our heavy bombers during attacks on three objectives in North Africa. Of special interest is the picture study of the pasting given the enemy airdrome at Tripoli before it fell to the Allies. Five pictures, arranged in sequence, show: the approach to the target at Tripoli, bombs away, the first hits, blasting the airdrome and its equipment, and finally the departure of the attackers, after causing heavy destruction.

"ME LONG-LONG", in the lingo of Pidgin English, means "I don't understand". And if you don't understand Pidgin we recommend a glance at the article on Page 29 which tells you about this useful language, practiced in the best native circles, and how the Special Services Division is teaching it. In addition, we present a brief glossary of Pidgin English terms in the hope that it will make "you savvy", or understand.

AS NEW DESIGNS and new tactics send our airmen up higher and higher, the question of oxygen and oxygen equipment becomes increasingly important. The front cover picture close-up of a combat crewman wearing the Type A-10 Demand Oxygen Mask is the work of Staff Photographer Sergeant Roger Coster. Next month we have scheduled a feature which will include a statement by Brig. General David N. W. Grant, The Air Surgeon, on the proper use of oxygen equipment, as well as some Do's and Don'ts on the subject and a series of picture illustrations.

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CROSS COUNTRY

Reviewing the Bismarck Sea victory, and other developments of the month within the Army Air Forces

A NUMBER of Superman stories seem to have grown out of the Bismarck Sea victory early in March.

When the boys knocked off the Jap convoy near New Guinea, a number of people were left scratching their heads. Even the first press reports from the Southwest Pacific summed it up as "incredible".

It was a landmark in the history of military aviation. But the Bismarck Sea victory was no miracle. When you analyze the engagement and the preparations leading up to it, you're convinced of that.

Good fortune played a prominent role. No one will deny it. "Half luck, half practice and rehearsal" was the way Lieut. General George C. Kenney, Commanding General of Allied Air Forces in the Southwest Pacific, described the annihilation of the convoy, with its thousands of troops and tons of equipment.

But a study of the action indicates two chief factors responsible for the success:

1. Thorough diagnosis of the enemy's plans and intentions, which was formulated well in advance from numerous sources of information, including excellent air reconnaissance of the entire scope of the enemy's movement and possible sea lanes.

2. Precise execution of a well-planned and coordinated medium- and low-altitude bombing attack, with fighter cover and with repeated attacks on enemy refueling bases on land near the scene of action.

The Bismarck Sea job took about 48 hours in all from the time the convoy was first sighted on the evening of March 2, until there was nothing left of it on the evening of March 4. A total of 20 missions was run. Approximately 35 percent of the bombs dropped hit home. Of the 20 missions, 17 were run on March 3. That was the red letter day.

The Japanese managed to maintain from 20 to 30 fighters over their convoy but our P-38s flying cover prevented them from effectively interfering with the action of our bombers.

Level bombing at medium altitude by B-17s and B-25s was followed closely by low, mast-high bombing by A-20s and B-25s, both of which covered their approach by strafing the decks of their targets. Additional protection was afforded through simultaneous deck-strafing by RAAF-manned Beaufighters. Attacking bombers alternately strafed barges and life rafts during the engagement.

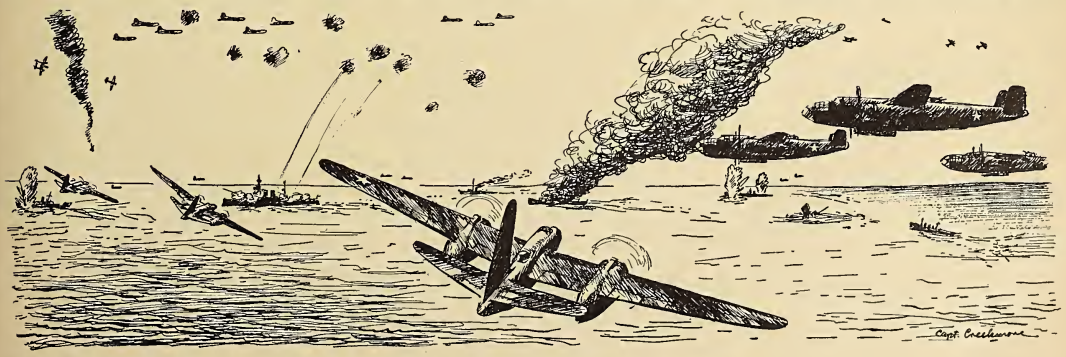
A flight of nine B-17s began the assault on the evening of March 2. The initial attack proved successful despite interception by about 18 Zeros and by intense, accurate anti-aircraft fire from the vessels of the convoy. One-thousand-pound bombs were dropped from altitudes ranging from 8,000 to 14,000 feet. Two direct hits were scored on a medium-sized merchant ship, which was left sinking; damaging near-misses were scored on an 8,000-ton and a 4,000-ton vessel, one of which came to a complete stop. One Zero was shot down and another probably destroyed. Five B-17s were damaged that day.

By the following day (March 3) the convoy was proceeding through the Vitiaz Strait between New Britain and New Guinea. Our planes then began pouring it on in weather marked by well-broken clouds and scattered showers. Here's the way the missions ran that day:

Twelve A-20s moved in low with 500-pound delayed-action bombs. They executed skip-bombing from mast-high altitude, scoring 12 hits on six ships which immediately caught fire, one of them exploding.

Four B-17s, flying at from 6,500 to 7,500 feet, then scored four near-misses with 1,000-pounders. They were intercepted by 15 fighters, five of which were destroyed. One B-17 was shot down, the only bomber lost in the entire engagement.

Twelve B-25s, flying mast-high, scored 14 hits on 10 ships with skip-bombing tech-



nique. One destroyer was sunk and another left sinking. One cargo ship was sent to the bottom, and another cargo ship and a troop transport were left sinking. In addition, a destroyer, two cargo ships and a transport were left burning fiercely. Ten enemy fighters attempted to intercept the B-25s but were ineffective.

Seven B-17s then attacked from between 6,000 and 9,000 feet, scoring direct hits on two 6,000-ton cargo ships. Seven of from 15 to 18 fighters intercepted by our bombers were destroyed, another probably shot down.

Next followed a wave of six B-17s which sank a 4,000-ton cargo ship with two direct hits and two near-misses, and set a second cargo ship afire with one hit and a near-miss. Five intercepting fighters were shot down, another probably.

Thirteen B-25s, some flying at 200 feet and others at about 5,500 feet, scored two direct hits and one near-miss on a 3,000-ton ship which exploded; two direct hits and four near-misses on a 5,000-ton cargo ship which was left burning; one hit amidship on a merchant vessel and one hit and three near-misses on a large transport, with resulting fire and explosions.

Six B-25s sank a 6,000-ton cargo ship, bombing from between 3,000 and 6,000 feet, and scored several near-misses on another.

Eight B-17s, in three flights at about 7,000 feet, left a 5,000-ton cargo vessel sinking with two direct hits, scored one hit and two near-misses on a destroyer previously crippled by B-25s. The destroyer was left burning. Twenty enemy fighters intercepted the B-17s. Four were shot down and a fifth was believed destroyed.

Five B-17s scored one hit and five near-misses on a destroyer and three near-misses on a 5,000-ton cargo vessel; fire and explosions followed. Three of 20 intercepting fighters were shot down. One B-17 was damaged.

One B-17 on a lone mission scored fire-setting hits on a destroyer from 7,000 feet.

Ten B-25s, flying mast-high, scored four hits on a destroyer which exploded and was left sinking, four hits on another destroyer which was set afire and was left probably sinking, and one hit on burning transport.

Five RAAF A-20s scored two direct hits and ten near-misses on a destroyer from about 2,000 feet.

Nine B-25s, some at low altitude and others at about 5,000 feet, scored six direct hits on two destroyers.

Five B-25s stopped a destroyer with four direct hits from 5,500 feet.

Meanwhile, 16 P-38s flying cover destroyed ten enemy fighters and damaged three others. Three P-38s failed to return to their base.

P-40s and RAAF A-20s attacked the Jap airdrome at nearby Lae, the P-40s dive-bombing. Other P-40s bombed Lae. Of 16 intercepting enemy fighters, six were destroyed and three probably destroyed. All P-40s returned.

At the same time, RAAF Hudsons bombed and strafed the Jap base at Dobo, and Dutch B-25s fired a fuel dump.

On March 4, one B-17 on reconnaissance scored two hits and two near-misses on a crippled destroyer, leaving it sinking. The lone bomber was attacked by 20 enemy fighters but returned safely after shooting down four of the intercepters.

Later reconnaissance that day revealed only one Jap ship left afloat—a destroyer. It was finished off by a flight of nine B-25s, which were opposed by one lone machine gun left in operation on the destroyer.

The Jap convoy had been annihilated.

Any number of estimates can be made concerning the significance of a victory like the Bismarck Sea job, but it's almost impossible to produce comprehensive conclusions while the battle of the Pacific is still going on. Quite likely, that will have to wait for the history books.

What we can't forget right now is the potential saving in Allied materiel and manpower by the destruction of the Jap convoy at sea *before* the force it represented could be brought to bear against our ground forces on New Guinea.

You can call that air support of ground troops, if you wish, or label it air power. But the fact is that 48 hours after Japanese troops and equipment were proceeding full speed ahead for land action against the Allies, those same Jap troops and equipment had been rubbed out by our planes before ever touching land.

Wearing of Parachutes

"In all flights of Army aircraft, with three exceptions, the pilot in command will ascertain and be responsible for insuring that:

"*Prior to Flight:* (1) A parachute is available, assigned and satisfactorily fitted for each person making the flight. (2) The assigned parachute is conveniently located to the normal position of the occupant to whom it is assigned and its location is known to that individual. (3) Occupants are familiar with the operation of the parachute equipment. (4) Occupants have knowledge of the operation of emergency

Theory and Practice of the Army Air Forces Reorganization

By **MAJOR GENERAL G. E. STRATEMEYER**
CHIEF OF THE AIR STAFF

A NEW organization for the Army Air Forces became effective at 0001 o'clock March 29, 1943. It is essential that all concerned understand the basic principles governing this revised organization in order that each individual may play his proper part. It is therefore appropriate to restate certain fundamentals.

Staff and Command Relationship

The Army Air Forces consists of Headquarters, Army Air Forces and the various commands and air forces. Headquarters, Army Air Forces, functions in Washington and consists of the officers shown above the command level on the master organization chart.

Army Air Forces operations are conducted by the several commands and air forces which, generally speaking, function outside of Washington.

Headquarters will tell the commands and air forces *what* to do but not *how* to do it.

The basic principles of this reorganization are:

1. Decentralization to the field of all purely operating functions.

2. Realignment of the Headquarters Staff, with reduced personnel, to formulate overall plans, policies, and programs for execution by the field.

3. Concentration within particular Headquarters staff offices of primary interest, in the problems of the several commands and air forces.

Role of the Commands and Air Forces

Under the new organization, Headquarters, Army Air Forces will:

1. Establish plans and policies for the conduct of operations in the field.

2. Produce and revise as occasion requires an integrated program for performance of the Army Air Forces mission.

3. Exercise broad supervision over the commands and air forces to eliminate duplication, resolve conflict, and insure compliance with directives.

The commands and air forces translate into action the policies, plans, and programs established by Headquarters. This requires:

1. Making decisions as to how to carry out staff directives.

2. Taking appropriate action to comply with all such directives.

3. Referring problems of policy, plans, and programs to the Commanding General, Army Air Forces, for decision.

4. Preparing reports for submission to Headquarters as required.

No organization with as complex a task as the Army Air Forces can remain static. Experience will indicate the need for adjustments in the functions set forth in the organization charts involved. As such adjustments are called for they will be made and the appropriate chart modified accordingly.

The new organizational chart of the Army Air Forces appears on Pages 20 and 21.

exits and their locations, and when deemed advisable each occupant will be assigned a particular exit for use in case of emergency. (5) An emergency signal and 'abandon ship' procedure are known and understood by all occupants.

"During Flight: Parachutes or the harness, in the case of detachable chutes, are worn by all occupants of aircraft; except that crew members, at the discretion of the pilot, may unbuckle straps and remove same temporarily for necessary movements within the airplane." (AAF Reg. No. 60-5, March 3, 1943).

The exceptions: (1) Commercial types of aircraft procured "off the shelf" by the Air Forces in which provisions have not been made for the wearing of parachutes. In this case, instructions will be issued in the Technical Orders covering such aircraft, prescribing the means for compliance with this regulation. If parachutes listed in TO 13-5-17 for use in liaison type aircraft are uncomfortable for certain individuals, the type parachute to be worn will be prescribed by the CO concerned, who also decides whether any parachute will be worn in types L-2, L-3, L-4, L-5 and L-6 series airplanes. (2) Except as may be specifically directed by the Commanding General of the Air Transport Command, the provisions of this Regulation shall not be applicable to multimotored transport type aircraft operated by the Air Transport Command over regularly established air routes. (3) This Regulation is not applicable to the pilots of aircraft transporting airborne troops.

Plane Designation Changes

The letter "R" (Restricted) will prefix the designation of combat airplanes of type, model and series which, for any reason, are no longer considered by Headquarters to be entirely suitable to perform their primary combat mission. Examples: the B-10 becomes the RB-10; the B-25A becomes the RB-25A. Combat planes will be placed in this restricted class only by the authority of Headquarters; those so classified will be listed in appropriate technical orders by authority of Headquarters. The new classification should not be confused with the status of the airplane, "Operational" or "Not Operational" as defined in AAF Regulations Nos. 15-110 and 15-111.

The letter "U" (Utility) will prefix the designation of transport and cargo planes ("C") normally providing capacity for eight persons (including pilot) or less, or for cargo weighing 1,400 pounds or less. Examples: the C-35 becomes the UC-35; the C-72 the UC-72. All types, models, and series falling within that definition which accrue to the active inventory of the Air Forces in the future will be designated "UC" without further reference to Headquarters. Planes so classified will be listed in appropriate technical orders.

Airplane designations which have been previously prefixed by "X", "Y" or "Z" will continue to be prefixed by these letters.

Source: AAF Reg. No. 65-44. —The Editor.

SNOW, SAND AND SARONGS

Missionaries have had a profound effect on natives all over the world—an effect which is peculiarly benefiting our flyers, especially in the South Pacific. Scores of crash survivors in New Guinea, the Solomons, and Northern Australia owe their lives to native friendliness. Religious medallions carried by flyers are recognized and serve as a passkey to aid. In the Solomons, the words "Tie Loto" mean "church people"—and a flyer using the word "Loto" will be welcomed and treated as a friend.

In some parts of New Guinea there are giant spiders whose webs, when baited, catch small fish whose fins become entangled and are held fast.

Sunburn can cost the life of a flyer forced down in tropical zones without sufficient clothing or cover. Even the most barren beach or desert can offer some protection. Scoop a hole in the sand, bury yourself in it, and cover your face with brush. Jungle leaves can be turned into clothing for protection. Lay low during the heat of the day. Do your traveling at night.

Grass is used to warm frostbitten feet in the Arctic. Senna grass, used for centuries by Eskimos and Laplanders, is packed into oversize shoes or boots. Its tough, absorptive qualities keep the feet warm.

Razor blades for close shaves! Pilots who have survived forced landings in the New Guinea jungle say that if you give a native an ordinary safety razor blade, you're treated royally. (Razor blades are carried regularly by pilots operating in this theater.) Australian stick tobacco, like cut-plug, is another "Open Sesame" to native assistance.

In the African Desert, salt chotts (salt beds), although resembling American desert salt flats which are frequently used for emergency landings, should not be used for landing purposes. The dry bed of these chotts is usually only a two- or three-inch crust, covering a vast quagmire which will drag down any aircraft or vehicle. "Don't be sucked in, boys!"

Difficulties encountered in making successful landings in Arctic and desert regions are attributed to deceptive reflection on snow and sand-colored surfaces which distort depth perception. The tendency is to level off high and plop anywhere from 10 feet to 50 feet to the ground. Pilots are advised to orient themselves by shadows and other reference points on the terrain.

If you're forced down in a jungle area containing no water, make your way to the coast. You'll be able to get water near the beach. Scrape the sand at the high-tide mark. Water will seep up. It may be brackish, but will be relatively free from salt and fit to drink and sustain life. Be sure not to dig too deep—you'll run into salt water. By experimenting, you'll find the best place to scoop for water.

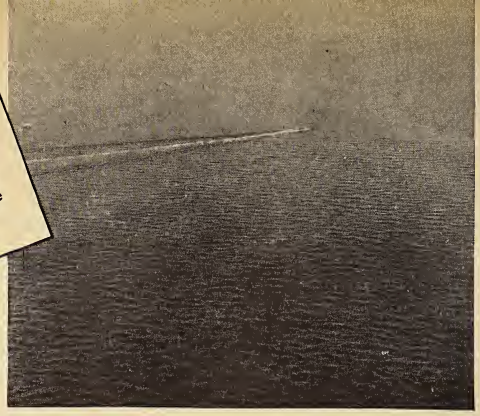
Air personnel, destined for service in Arctic regions, had best look to the firm anchoring of their teeth fillings and inlays before heading north. In extremely cold climates, the metal contracts in low temperatures and fillings pop right out of teeth.

Tips on the treatment of North African Moslems: Don't offer pork to a Moslem. Don't smoke, spit, or loiter in front of a mosque. Don't slap a Moslem on the back. Don't speak to, stare at, or touch a Moslem woman. Try to speak Arabic—the Moslems like it. Pass your cigarettes out freely—they make friends.

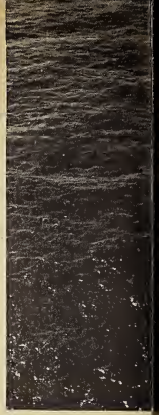
Dr. William Beebe tells us that "There is more danger of attack from the 'rattlers' and 'copperheads' on the Palisades opposite New York City than there is of being bitten in a tropical forest or jungle by a cobra or a viper, providing you are able to walk or move about and thrash the undergrowth with a stick."

The Arctic, Desert and Tropic information center welcomes contributions from all Army personnel possessing knowledge of the non-temperate theaters of operation. Submit to Arctic, Desert and Tropic Information Center, Eglin Field, Florida. ☆

Here are actual combat photographs made during two separate but identical air attacks on submarines. The best pictures were chosen for the following sequence which shows how an aerial attack on an enemy submarine takes place from the time the sub is sighted by the attacking plane until the U-boat is sunk.



SIGHTED: The crew of a patrolling plane sights a U-boat and attacks. Speed is vital; a submarine can crash-drive in 30 seconds.



THE RUN: Divi over the submarin machine guns raki

fishing FROM THE SKY

By Captain Harold B. Ingersoll

A-2 Section, Antisubmarine Command

The Antisubmarine Command of the Army Air Forces has been assigned the job of seeking out and destroying enemy submarines wherever they may be found. However, most men in the Army Air Force probably are not acquainted with the fact that a special technique is required to combat submarines from the air.

A combat crew with bombardment training for land-based targets under its belt must be further trained in the special technique of U-boat warfare. To develop this technique, the Antisubmarine Command has established a special training school.

The training program includes recognition of types of enemy submarines, approach and attack procedure, identification of points of vulnerability to gunners and bombardiers and instruction in related subjects pertaining to the particular duty to be performed. Navigators, in particular, must know special techniques employed in overwater navigation.

Types of aircraft used by the Command in antisubmarine warfare include the B-17 and B-24 heavy bombers, B-25, B-18 and B-34 medium bombers, and the A-20 and A-29 light bombers.

The antisubmarine bomber takes off normally prepared to be in the air continuously from six to eight hours. As the ship roars out to sea, the crew takes up battle stations assigned, all eyes, however, not losing sight of the primary mission. To make antisubmarine warfare more efficient, engineers have developed special equipment for tracking down submarines not sighted visually.

A definite zone of responsibility is assigned each mission and it is the job of the combat crew to patrol the zone so that no object on the surface will miss detection. On a routine flight, ships, debris and other objects may be sighted in the water. All must be carefully scrutinized to determine the importance of the sightings which will later be evaluated in an intelligence report.

In the early days of submarine hunting an airplane would occasionally fly low over a swirl in the water, release depth charges and then circle back to find that an innocent whale—not a Nazi U-boat—was the victim of the attack. To avoid future errors in evaluation, combat crews are trained to distinguish types of swirls.

When an enemy submarine is actually sighted, different approaches for attack are made depending on the circumstances.

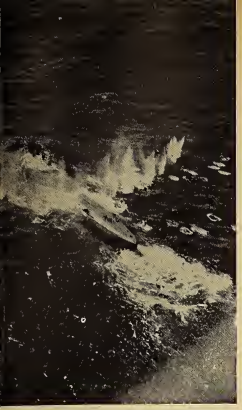
If the submarine is sighted five or six miles distant and it is apparent that it is already crash-diving, then the most direct approach possible is made. Depth charges are released on the visible target or on an estimated projected line of motion as determined by the area showing on the surface where the submarine submerged.

However, when the plane's approach from the distance is unknown to the U-boat, then the aircraft will seek the nearest clouds in order to maneuver into the most advantageous position for attack. As soon as a favorable position is reached, the plane noses down at an angle so that it will fly over the submarine at proper bombing altitude.

It is customary to release depth charges from extremely low altitudes. Gun fire of the plane is usually directed at the conning tower or at the submarine deck guns, if, as in rare instances, they are brought into play.

Many different situations may arise in the two or three minutes in which the attack is underway. If the skill of the pilot and crew results in an ideal approach, the pilot makes the customary low level bomb-run. However, the submarine may have crash-dived. In this case, a swirl, or turbulence, on the surface of the water is the only guide for the pilot and bombardier. The bombardier must be able to estimate the approximate location of the sub under water.

Quick action by the plane is imperative



he deck, the plane akes run. Note spray ising from bullets.

EVASION: A depth charge has been dropped. The submarine tries to evade it by turning sharply, as plane continues to strafe.

EXPLOSION: The sub is hidden by the blast of the depth charge but the U-boat's wake can be seen leading up to the explosion.

New techniques in aerial warfare have been developed to combat the U-boat menace.

when a U-boat crash-dives because a submarine can descend beyond depth charge range in a very short time.

But the attack is not over by any means. A marker is dropped on the water and the exact location of the U-boat submergence is noted by the navigator. The plane continues to patrol a wide area in a radius from the point of the crash-dive. This is done because the number of hours a U-boat can stay under water and the distance it can travel under water are relatively limited when compared to the aerial coverage of an antisubmarine squadron in distance and hours. The area of the sighting will be kept under continuous surveillance depending upon the evaluation placed upon this sighting.

ATTACKS will often result in disabling the U-boat to the extent that it cannot submerge, but remains on the surface. This affords the plane an opportunity for a second attack which to an experienced crew is like shooting fish in the well known barrel.

If exit through the conning tower is still possible, the submarine crew may attempt to man its guns as a defense against a second attack. Likewise, when a submarine is surprised while surfaced to charge its batteries and a crash dive is not immediately possible, guns may be fired at the plane.

Such gunfire is usually quickly silenced by the return fire of the plane. By the time the aircraft comes back for another attack, the U-boat may have submerged to avoid further encounter with the aircraft. Of course, the U-boat may not have had any choice in the matter of submerging if the first depth charges scored either direct hits or near misses, near enough to cause a sinking.

Attacks by planes are not limited to daylight. Night attacks have been successful. The possibility of surprise is even greater than in daytime because a submarine will surface under cover of darkness to perform the highly necessary job of recharging its batteries. Searchlights or flares from the aircraft spotlight the target in ideal fashion.

As in bombing raids conducted over ground targets, attacks at sea are assessed according to the results shown on the pictures taken at the scene of the action plus the mathematical analysis of all elements concerning the attack. When searching the area after an attack reveals debris, such as pieces of wood from what is supposedly the inner part of a U-boat, that is not necessarily an indication that severe damage has been inflicted because enemy submarines have been known to shoot debris and even oil to the surface in order to deceive attackers.

However, when debris, oil and the bodies of the submarine crew come to the surface, then the results can be ascertained as a kill. It is probable that a submarine may have been sunk when only debris and oil come to the surface. But because no definite proof is evident, the Army and Navy chalk up such an encounter as "probably damaged".

The use of planes in antisubmarine warfare has resulted in important tactical advantages for the Allies. Planes force U-boats to stay under water where their ability to destroy is greatly reduced. In addition, the longer the submarine is forced to stay under water, the less time it has for recharging its batteries on the surface.

Morale of enemy crews suffer from repeated crash-divings when planes are sighted. U-boat crews fear aircraft because of the death and destruction resulting from a surprise attack. Surprise is the kind of medicine that the sub has always relished dishing out and to get some of its own medicine is not particularly relishing to the U-boat crew. ☆

THE KILL: A portion of the submarine, barely visible, projects from the water as the full force of the explosion spends itself, subsides. Passing low over the attack area, (below) the plane's crew gets this picture of the sub settling, part of it piercing the surface.

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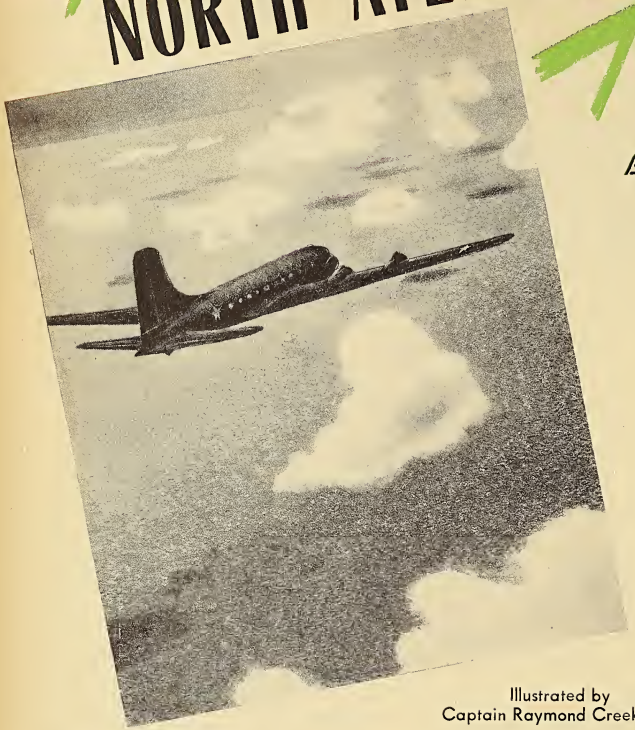
The NORTH ATLANTIC Hop

By Captain Robert B. Hotz
AIR TRANSPORT COMMAND



Illustrated by
Captain Raymond Creekmore

CHRISTMAS mail has filtered through to the most remote airdromes along the North Atlantic hop. The boys at some of the stops are beginning to dig out of the winter snows. Wing Headquarters in Maine reports the temperature almost above zero. The signs are unmistakable. The North Atlantic route is thawing out.

If you are interested in a few tips that may make your big jump across the pond a little smoother, pull up a chair in the briefing office where some of the veterans gather to thumb new route guides, check radio changes and do their hangar flying.

These particular veterans are civilian pilots of the Air Transport Command. They all learned to fly in Army and Navy schools, most of them in the dim, distant pre-Randolph days. All of them put in thousands of hours pushing DC-3s around the domestic airways before joining the command. Since then they have made from ten to twelve round trips apiece across the North Atlantic and shuttled Douglas C-54s and Boeing Stratoliners to Africa and India. All of them have been in trouble at some time or other over the waves and all of them have pulled out of it.

The North Atlantic is a well organized air route. RAF cooperation is good. There are facilities to take care of almost every problem encountered by aircraft — from radio navigation aids to protection against enemy activity.

The system will work if you know how to use it intelligently. It will make a routine crossing comparatively simple. If you run into trouble it will save your neck and your airplane if you give it a chance. Pay strict attention to your briefing officers.

Don't be fooled by the H.P.'s who come back from one eastbound crossing and hold forth in the BOQ on what a cinch it is to fly the North Atlantic.

You can gain from the experience of men like Larry Trimble, who made some of the first crossings in the Boeing Stratoliners and now has a dozen round trips to his credit. Once, Larry was barging along at 800 feet under a 1,500 foot ceiling somewhere west of Scotland. It was late afternoon.

"We sighted a big liner about 25 miles away with a bone in her teeth," Trimble relates. "About four miles to the port was a camouflaged escort vessel—a destroyer or light cruiser. We passed within several miles of them and altered our course. As we drew almost opposite the escort I saw a series of flashes from her front deck. It looked almost like the challenge signal of the hour. We answered and kept on going.

"Suddenly we noticed two big columns of spray rise from the sea ahead. The next minute the plane rocked violently from a burst of flak around us. What we thought were signal flashes were the guns of the escort's forward battery ranging us with solid shot. When they opened up with flak they had us bracketed perfectly. The next salvo would have torn us apart.

"We jammed on full power and dove down to water level, dodging and working away from the ships. I felt like a duck over a pond on the opening day of the season. We used all the recognition signals in the book but they fired about fifty rounds at us. Luckily we were going away fast and they never came close again. Two hours later, while we were cruising between cloud layers at 4,000 feet, more flak began bursting off the left wing. We got out of there in a hurry, too. I have never been curious about a convoy since."

Gunners were more accurate on the Stratoliner piloted by Stanley Stanton. Somewhere south of Greenland, Stanton's plane was plying through broken clouds and scud at about 1,500 feet. As the plane emerged into a clear opening, a surface vessel below opened up with .50 caliber and 20-mm. anti-aircraft guns. A chain of .50 caliber slugs lashed across the tail fin and elevators. A 20-mm. explosive shell ripped a big gash in the metal skin at the base of the fin near the rudder control cables. Stanton pulled up into the overcast before further damage was done.

Another veteran, Earl Fleet, found himself in a Stratoliner over British warships one day.

He ordered the radio operator to fire the Colors of the Day. The operator discovered that the Very pistol they were carrying wouldn't fit the plane's flare chute. Finally the pistol was fired through the open cabin door. A flareback resulted, setting the rag wrapping of the pistol on fire and burning the operator. Meanwhile, the boys in the cockpit were spending some uncomfortable seconds waiting for the Colors of the Day

fireworks to burst. Moral: Stay away from convoys and ship concentrations. Make certain that all your signalling equipment is in order and that your crew knows how to use it. Flak gunners aboard ship have orders to shoot first and ask questions later in case of doubt on the identity of aircraft. Your identification signals may not always be read by surface vessels. Avoid the possibility by giving convoys and ship concentrations a wide berth.

Always make positive identification to the RAF Fighter Control through procedures outlined by your briefing officers. You are an unidentified aircraft if you don't, and you get no consideration. Don't let an overcast give you a false sense of security. You can be shot down in a cloud while on instruments.

REMEMBER that flying the North Atlantic is a precision operation. You have to hit what you aim at. Most of your alternate fields outside a relatively small area in England and Scotland are in Eire (neutral) Norway (enemy) and France (enemy). One of the enemy's favorite tricks is to help you along to a landing at these alternates. Radio navigation facilities are good along the North Atlantic routes but the farther east you travel the more they are susceptible to enemy jamming.

Larry Trimble gives you a good idea of what can happen if you doze over your radio. He made one eastbound crossing in the midst of heavy traffic. The weather forecast was good and he avoided a front by laying a rhumb line course based on the forecast. His course took him through layers of clouds most of the way. He flew eleven hours on instruments without a star shot above or a drift reading below. In the morning he descended to sea level. There the navigator took a double drift reading. He found they

Your flight over the big pond may be smoother if you listen to these veteran pilots of the Air Transport Command

had a terrific south wind indicating that they had been blown considerably north of their planned course. He asked for a QDM and quickly got a bearing that indicated he was south of his destination. Trimble stuck to his drift data and flew south for thirty minutes. He asked for another QDM. It came back in a flash. Perfect service, but the bearing indicated he should fly even more of a northerly course to his field. He became suspicious and challenged the DF station. There was no answer. Then he was certain it was an enemy station sending false bearings to lure him north over the top of Scotland toward Norway. He continued to fly south. In another half hour he began to pick up faint signals from the beacon that would bring him into his destination. He asked for another QDM and got a bearing even farther north than the other two. Shortly afterward he picked up a warning from an English station: "Don't use radio bearings. Enemy transmission."

Several planes in the flight the night before were finally pulled in by authentic QDM bearings. Others landed all over England. Two were missing.

"The North Atlantic is a war zone—you can't forget that," cautions Trimble. "You must appreciate the ingenuity of the enemy and act accordingly. You can't leave any loose ends in your operations. You'll wind up in a prison camp or a rubber raft if you do."

When you hear a high pitched scream, a band blaring Yankee Doodle or a voice counting in German on the stations you are trying to work, switch to another one immediately. Don't accept radio bearing without authenticating them by challenge. Your briefing officer will tell you how to do it. Study your list of alternate radio facilities before you take off. It may be too late for study when you find the enemy is jamming the stations you planned to use.

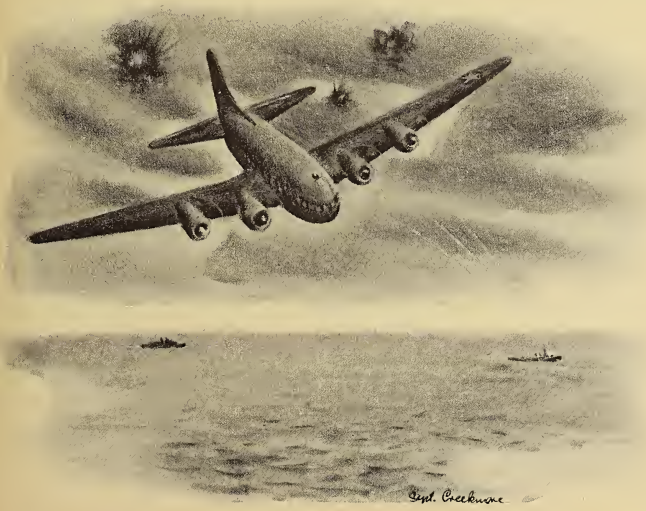
Even on the best days over the North Atlantic you will always run into some weather. A major front and several secondary fronts are the minimum for a crossing and often you will hit two or three big fronts. Weather reporting facilities are good along most portions of the route but forecasts are far from perfect.

Take the case of Don Terry and Lawrence Chiappino who made one of their numerous eastbound crossings in C-54s on the same night last fall. The forecast showed a high centering around one point on the route. Chiappino flew the direct route to England. Terry decided to go farther north via Iceland to take advantage of the supposed good weather in that area. Chiappino had a good crossing, encountering only a mild front with rain, some turbulence and icing conditions at 3,000 feet. He emerged into a broken overcast on the other side of the front and was able to get good star shots for celestial fixes. The icing level went up to 6,000 feet.

On his northward track, Terry ran into a swiftly growing cold front uncharted in the forecast. He hit freezing rain down to 400 feet, and severe turbulence. Terry managed to beat the front into his planned stop. The front moved in with freezing rain to the ground before he was ready to take-off for England. He was able to get away only because of a temperature inversion from 200 to 500 feet. On his westbound trip beyond the point of no return, Terry encountered an occluded front not forecast, which forced him down below 400 feet to lose a heavy ice load picked up during the first ten minutes in icing conditions. His wing and prop de-icers functioned well but an inch and a half of solid ice formed on the windshields beyond reach of the wipers. Turbulence became so severe that both Terry and his co-pilot had to exert pressure on the controls. For two hours the C-54 ploughed along between 250 and 400 feet with temperatures from 29 to 33 degrees Fahrenheit. There was a heavy sea running below. Salt spray splashed across the cockpit windshields and over the window in the navigators compartment. For two and a half hours the C-54 pitched, rolled and careened through severe turbulence with ice less than 100 feet above and the tops of the cold salt waves less 200 feet below.

"It was too tight a squeeze," says Terry. "For two and a half hours I thought I was making my last flight. It was the worst experience in my twenty years of flying."

The C-54 finally emerged into heavy cumulus clouds with only mild turbulence and light icing conditions. Terry topped the



cumulus at 12,500 feet and completed the trip without further incident.

"You have to plan your flight according to the weather forecast," adds Chiappino, "but you must check weather in flight against the forecast. There are terrific wind shifts and icing level changes in cold fronts over the North Atlantic. If you don't check actual weather against the forecast you are heading for trouble.

"Watch changes in cloud formations, turbulence and temperature to spot the beginning of frontal conditions. Then you can find out where the front actually is and plan for the wind shift and conditions ahead. You may have to change your plan several times because of weather but unless you have an original plan on which to base your changes you can get wound up in a hurry."

Fred Richardson warns against allowing lack of clouds to fool you about the presence of a front. "Secondary fronts often lose their cloud formation after they get out to sea," he explains. "All you get are a temperature change and a wind shift. Sometimes you can spot the wind-shift line along the waves below without a cloud in the sky."

"Ice is one of the biggest problems over the North Atlantic," comments Chiappino. "You can find ice somewhere during every crossing. The worst icing conditions generally lie in a layer about 15,000 feet thick. Often it gets right down to water level. If his plane can't top the upper icing level, a day of rest will be beneficial for any pilot.

"If the lower icing level is a couple of thousand feet above the sea level," he adds "you have to figure the possibilities of it coming down or ascending according to the forecast. Plan to top the ice and use star shots to check your course or stay below and rely on drift readings to figure your track. Ice can build up fast over the North Atlantic—as much as an inch in 60 seconds. If the weather is good, a crossing can be made under 1,500 feet. If it isn't, it would be tough to be below an icing level closing down to the wave tops."

"Generally, the weather gets better during eastbound flights and worse as you near home on the westbound trip," says Richardson. "You don't have to worry too much about weather at your eastern terminals."

"Don't be in a hurry to land. Remember that all the airdromes in the British Isles are well camouflaged. Make sure you are landing on a runway before you sit down.

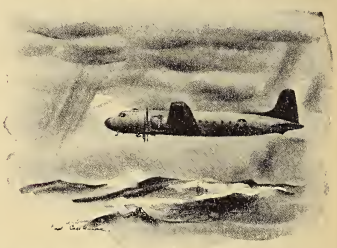
"The weather is never bad everywhere in England and Scotland. If your reports indicate that the west coast of the British Isles is going sour it is generally a sign that the eastern coast is open and vice versa. The whole island is never socked in at the same time. It pays to plan alternates accordingly."

"That's not true of the western terminals," adds Trimble. "I learned that lesson the hard way. We were westbound in a Stratoliner without radio contact due to skip for 11 hours before we made a landfall. The forecast called for perfect weather. Fifty miles from our western terminal we got a weather report of a 100 foot ceiling there with a 1,500 foot top. We had a definite alternate picked out but had been bucking headwinds all the way across, so decided to go down for a look. We were about 100 feet over the field when the tower called and said visibility had closed to 75 feet. We finally made our alternate but it wasn't fun.

"Another flight coming in behind us had been flying at higher altitudes in stiffer winds and had even less gas than we did. He finally made it in to another alternate under a 100 foot ceiling with his gas going fast. If we both hadn't had a lot of experience with the fields where we finally sat down there would have been real trouble."

"You can't always depend on your radio even if the Jerries aren't jamming," reminds Ross Weaver. "Aurora Borealis does some fine natural jamming. Weather conditions often produce a skip zone in which no radio signals can be received. Rugged terrain makes all but the over-the-water legs unreliable. Look out for false cones of silence in the same territory."

"Never carry less gas than you can squeeze aboard," cautions Trimble. "Those extra gallons can be the most precious cargo in the world sometimes. Personally make sure the gas you ordered is actually in the airplane before every take-off. I remember what happened to one pilot who didn't. He was taking a B-17 from a jump-off field in South America. Two and a half hours



out the field got a frantic radio call. He was out of gas and going down. A checkup revealed that he had forgotten to check on the servicing of his plane. He assumed it had been gassed. It wasn't. The plane and crew vanished in the South Atlantic. It hardly seems possible to make a mistake like that but there is a quarter of a million dollars of airplane and nine men missing to prove it can happen.

"Another pilot ferrying PBY's across fell victim to the same error. At the last minute he was ordered to ferry a different airplane. He climbed in with his crew and took off without checking to see whether the new ship had been gassed. It hadn't. He was lucky that time. He sighted a tanker while sputtering on his last gallons and landed beside it on a fairly calm sea. The tanker happened to be carrying high octane gas. He refueled, took off and made it to the Azores.

"I heard about the same pilot again just the other day. They found him in Africa, directly on course to his destination. He was plastered 4,000 feet up on the side of a 6,000 foot ridge." ☆

Precision BOMBING DOES THE JOB

In the smashing drive of the British Eighth Army across North Africa and in Allied assaults on the Afrika Korps' stubborn Tunisian defenses, precision bombing by our Air Forces has played a vital role. It has paved the way for advancing land armies by crippling enemy defenses. It has smashed Axis reinforcement ports along the Mediterranean coast. It has shattered enemy airdromes with tons of high explosives.

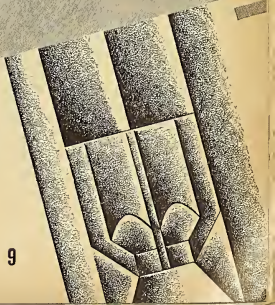
On this page and on the two following pages AIR FORCE presents a pictorial study of attacks on three important objectives in the North African theater. These photographs were taken with cameras aboard the attacking bombers.

These particular missions were carried out by the same bombardment group, employing B-17s, to which a raid on enemy targets hundreds of miles away from home station literally has become "all in a day's work"—almost every day.

(Continued)

Direct bomb hits from B17s flying at 24,000 feet blast the Tunisian seaport at Sfax where the Axis had unloaded thousands of troops and tons of equipment. Smoke and debris rise from the battered docks as other bombs leave their telltale bursts in the harbor.

The pictures above could well represent an aerial warfare "before and after." The Libyan fortress at Gadames (arrow) escapes the full effect of the first sticks of bombs but is literally erased by a series of direct hits a moment later.



RAINING BOMBS ON

One sure way of avoiding excessive fighter opposition during an offensive, of preventing poundings from enemy bombers, is to knock out the enemy's airfields.

The series of photographs on these two pages tells the dramatic story of what happens when American heavy bombers set out to accomplish such a purpose. This airdrome at Tripoli was pounded time and again before the British Eighth Army moved through the city in its chase of Rommel's forces.

Hangars and other field installations were hit, and then hit again before the enemy had a chance to completely rebuild.

Later, intelligence photographs showed this particular raid resulted in the destruction of a number of Axis aircraft on the ground despite protective measures taken by the enemy.

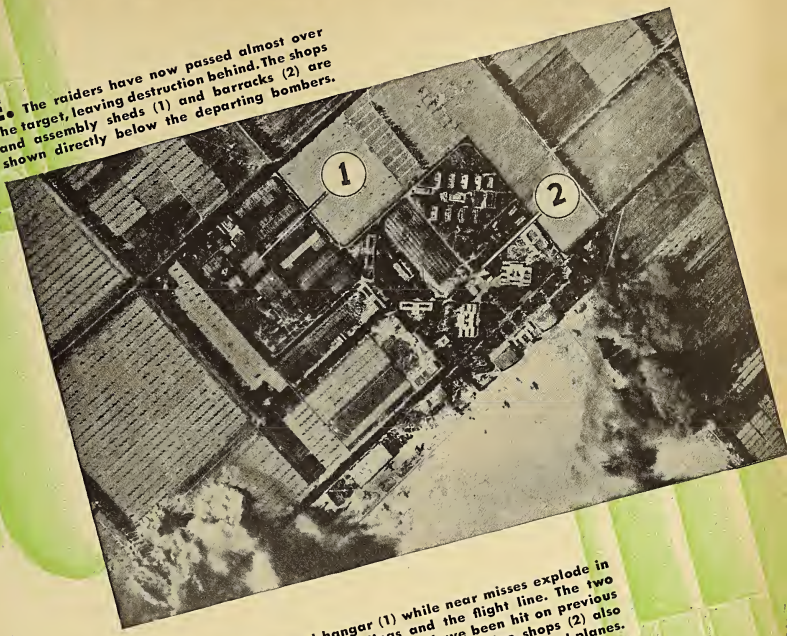
The Tripoli airdrome, long recognized as one of the finest in all of North Africa, has been put to good use by Allied planes since it passed into British hands.

A. (above) Heavy bombers at 10,000 feet approach the Tripoli airdrome on a mass raid. Axis planes are dispersed over the edge of the field, some in concrete "S" and "U" revetments which have been accentuated (1) in this photograph by a staff artist.

TRIPOLI AIRDROME FROM 10,000 FEET

C. The first bombs (above) find their mark. Smoke and dust billow from a hangar and other structures (1) as a result of direct hits. Fighters and bombers are among the enemy planes scattered over the field and along the tree-lined edges of the airdrome.

E. The raiders have now passed almost over the target, leaving destruction behind. The shops and assembly sheds (1) and barracks (2) are shown directly below the departing bombers.



D. Other direct hits (below) destroy a second hangar (1) while near misses explode in an orchard (4) immediately behind the row of buildings and the flight line. The two hangars standing out clearly in the upper right of the picture have been hit on previous raids and are now partially repaired. Personnel quarters and machine shops (2) also have been battered. At the left of the quarters is a small lot (3) filled with wrecked planes.

B. Bombs away (left). Sticks of bombs (1) extending the length of the picture hurtle toward their objective. Revetments, which protect planes from bomb fragments and ground strafing, are shown again (2). A double "U" may be seen at the right.

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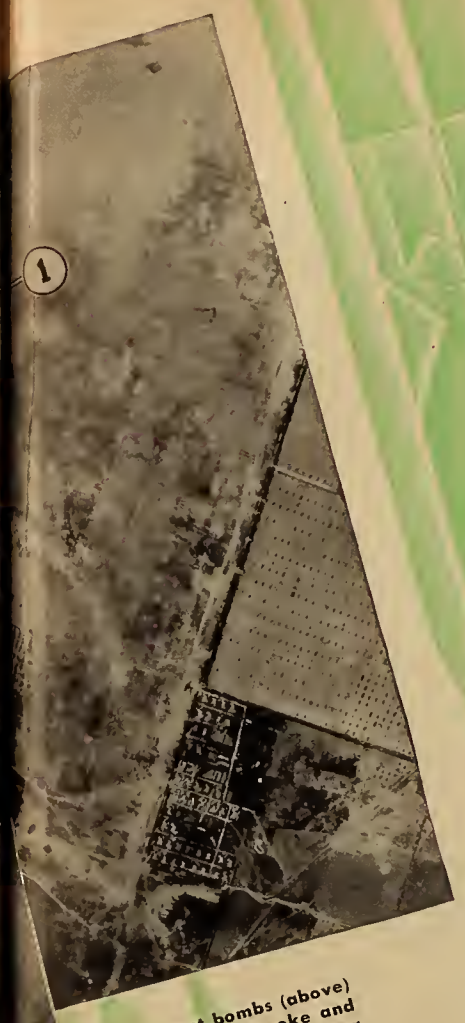

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COMPRESSIBILITY

IV — Its Influence on Tomorrow's Planes

By Colonel Ben S. Kelsey

PRODUCTION DIVISION, WRIGHT FIELD, OHIO

EARLY in the game, when local compressibility effects were first appreciated, it seemed that the rapid build-up in drag of a number of small items, such as windshield corners, air scoops, fillets, and so forth, might very well build up drag to such an extent that they would in themselves definitely put a top limit on speed.

It would appear now, however, that some of these local compressibility effects have actually gone through the transition stage and may be operating out in a range corresponding to the type of airflow which we expect from bullets, where drag co-efficients can again be measured and held to higher but reasonable limits. If this were not so, we would some time ago have reached a fairly uniform dive performance for all airplanes. Actually, diving speeds seem to be going on up in a fairly steady manner. In the same way, airplane speeds would have shown a dropping-off in progression from year to year, and this is not apparent.

We are obviously in trouble on all present airplanes to some degree when we approach very high speeds, and the terminal velocities in dives are definitely retarded by compressibility effects. But there seems to be no absolute wall, which had been expected some time in the past.

Aside from the wake behind local compressibility effects, which may affect other parts of the airplane or which may add up one with another to produce alarmingly large effects, the biggest problem is that connected with lift; and, secondly, as another phase, control.

Lift on an airplane wing as it is now known depends upon giving the air a downward shove as the wing goes by. This means that the air has to accelerate to flow aft over the top of the wing and has to accelerate forward on the bottom. This again is tied up with curvature, displacement, and the speed of passage of the wing.

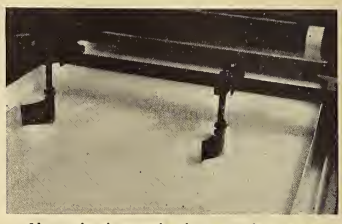
As would be expected, there is an early and marked change in the characteristic of lift and pressure distribution over the top of the wing, since the greatest curvature and speed-up occurs here. The inability of the little air particles to maintain smooth contact with the wing, and their tendency to set up waves, produces a condition not very different from the normal stall at low speeds, since at high angles of the wing the particles are unable to accelerate fast enough to get out of the way and back into line to follow the wing surface. This might be likened to a cam on the cam shaft of an engine on which the valve spring is the elastic force corresponding to the elasticity of the fluid particles. For a given steepness of cam there is a limited speed for the cam shaft, beyond which the cam follower will not maintain contact with the cam but will bounce or cause excessive impact loads.

If the speed is low, the cam can be made steeper, but it is still possible to build such a steep cam that the same effect results as though the more gentle cam were run at much higher speeds. Although there is no apparent "shock wave" at the lower speeds and high angles, the effect on lift of the breakdown of smooth flow is much the same. The airplane, in effect, stalls and goes through much the same change in moments and forces due to excessive speeds as it does due to excessive angle.

Since the conventional wing maintains its sharpest curvatures up close to the nose, one would expect a breakdown to occur here first. This actually occurs, with quite a drop in the suction obtained over the forward portion of the upper surface. As speeds increase, the suction increases farther back on the wing and decreases up forward until a fairly average value is obtained over most of the upper surface, also, the wing stubs its toe and gets high positive pressure on the top of the exact leading edge.

The change on the lower surface, as would be expected, is less pronounced but does change in character. The positive pressures move forward in what amounts to a planing effect. Apparently the inertia imparted to the little particles causes a kind of separation farther back which, at very high speeds, may amount actually to suction on the aft half of the bottom surface. The overall result is that the total lift drops off very rapidly for any given angle as speeds of 80 to 90 per cent of the speed of sound are reached. Also, the redistribution of the loading gives a diving tendency.

Going again to bullet design, boat hull design, and the general considerations already discussed in this series of articles, it is evident that thick wings with very rounded surfaces just after the leading edge are going to be the worst offenders and produce the results sooner. Wing forms are now available which help a little bit in delaying or reducing the intensity of these effects. Their maximum depth will be somewhat farther back than the wings to which we have been accustomed. The exact lead-

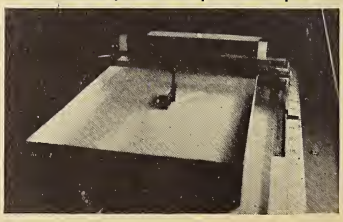


Above is shown the increase in wave formations with increasing displacement.

When the angle of the object sharpens at the same speed, the waves increase.

Here is shown the early formation of a wave at a discontinuity in the surface.

Above shows the increased wave at higher speeds compared with the preceding photograph. Below, waves form at the bump on the top of the liquid.



ing edge will be rounded but of fairly small radius, with very gentle curves from there back. It is, of course, possible to use a very thin wing with a sharp nose designed to operate under some particular conditions where the effect may be considerably reduced. But the over-all efficiency of such a wing would probably be fairly low.

Obviously, any discontinuity in a surface which has a pressure gradient over it will add another bump to the pressure hill, with the result that a compressibility effect may occur at that bump. This is not very different from putting a small ski jump in the middle of a hill. Since most of our control surfaces control their lift by bending the surface, they in themselves are apt to be guilty of early compressibility effects if any large displacement of the controls is required or used. Such effects may be concentrated at the point where the bump or bend occurs.

By considering the discussion ahead, it should be possible for a pilot or engineer to make some fairly good guesses, even on the basis of our present limited knowledge, as to the suitability of an airplane for high speed and interpret, to some extent, the proper operating technique. Thick wings and wings with blunt leading edges ahead of the front spar will, in all probability, produce very marked and probably sudden changes in lift and trim.

Whenever two bumps or bulges occur at the same distance aft on the airplane, and close enough together so that the local relative speeds and pressure hills are added, we can expect a bad spot. Any sudden discontinuities in the line, such as a sharp intersection of the windshield with the fuselage, or a sharp break between the windshield and the rest of the canopy, or an unfaired junction of a scoop or a control surface, will in all likelihood produce a local wave. It is true that its effect may be limited largely to making noise. Control surfaces with bad discontinuities may be expected to produce erratic characteristics at high speeds. As the wave effects have not been fitted to the surface, which is still an impossibility, there is no telling exactly what the change in forces may be which the pilot feels. This effect, particularly on balanced control surfaces, is separate from any over-all change in trim on the airplane. Obviously, the more scoops and the more obstructions or bumps on the whole airplane, the greater the probability of compressibility effects, with particular reference to increases in drag.

To date, compressibility effects have tended to provide terminal velocities either in level flight or in dives, which in itself has tended to prevent the attainment of speeds where the more violent forms might be expected. One perfectly legitimate approach to the situation is simply to provide additional braking effects to prevent running over into supersonic regions.

Luckily, these supersonic regions are still somewhat above level flights obtainable and are sufficiently far away to permit relatively unrestricted use of airplanes, even in combat. This obviously is not the permanent cure for the trouble. If the individual items going into compressibility effects are carefully modified, it is possible to move the critical speeds of each up to a point corresponding to what might be termed the over-all critical speed of the airplane.

There are several ways of tackling tomorrow's problem. One is to work on the control of the pressure distribution over the airplane by shape design and thus, by controlling the pressure hills, influence the waves and forces. There is some promise, already in evidence, of the ability to control the pressure distribution around the wing, by use of auxiliary gadgets so as to counteract some of the lift and moment effects. Anticipating that there must be wave formations of some sort at supersonic speeds, it will be necessary to fit the waves and the airplanes together, minimizing and predetermining the wave formation, perhaps even fitting the dimensions and curves of the plane and its parts to the wave and speed expected.

Illustrating a blunt windshield with a corner at the junction of the canopy, compared to one that is better faired.

Obviously, one of the most serious situations is that the conventional airplane drags a lot of its essential structure and control elements behind the portions making initial entry, with the result that in the event of wave formations, or "compressibility burble", some of these parts may be wading through turbulent air that would put the Niagara Rapids to shame. Consequently, the geometrical arrangement of the parts may be determined as much by compressibility as any of the factors now in effect. Control and lift may be obtained by supplementary apparatus which control pressure distribution around a basic body, rather than by changing attitudes or using remote lifting surfaces as we do today.

THE biggest problem of all has been neatly ducked so far. That is, how do we get the thrust to drag airplanes at these speeds? In dives, the weight of the airplane helps out considerably, particularly for dense, clean airplanes. In level flight, however, power has to be converted into thrust. And since the conventional propeller adds its rotational speed to the forward speed, its blades, which "lift" just as a wing does, are more subject to compressibility than is the airplane as a whole. To date, the propeller has been a remarkably efficient means of obtaining thrust, almost as good as though geared to the air, but we can't afford big losses in efficiency.

Perhaps as we find out more about the variations in forces at supersonic speeds, it may still be possible to utilize the same general propeller principle. Jet effects, rockets, and so forth, offer considerable promise and there is, of course, the possibility that the propeller or some equivalent device might be either fitted into the wave pattern of the over-all airplane or used in a low speed airstream in some way so that the efficiency of the component parts is not reduced as radically as it is at present.

There is, of course, another serious consideration: that is, at high speed the actual air forces, themselves in pounds, become very large, with the result that the structural design of vehicles to operate at such speeds is no simple problem in itself. This, however, would be fairly straightforward if we only knew what the loads were.

The most serious difficulty probably is that we can't see air! Consequently, we can't see what it wants to do or what it refuses to do. Furthermore, it is not particularly safe to explore this region in full-scale flight—the penalties for mistakes are infinitely greater than at slower speeds, not only because of the short time available for a pilot's reactions but in the actual forces and accelerations involved.

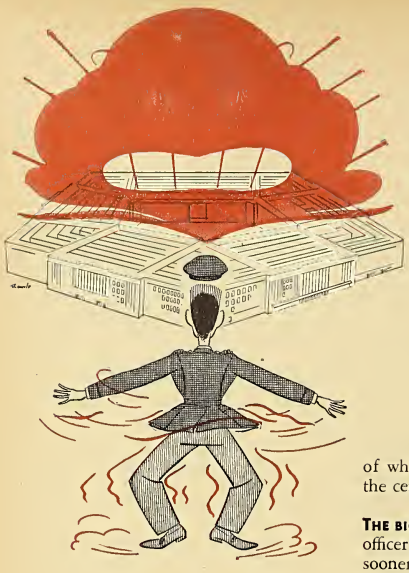
Putting it simply, the human body needs the protection of the aerodynamic hull, and the flight path has to be under good control to reach bullet speeds. According to the stories of race-boat drivers who have been pitched out on water at speeds of 60 mph. or more, water feels like concrete. On the same basis, getting hit by a blast of 700 mph. air would probably feel like getting hit with so much soft pine, so that stepping out in a parachute isn't the simple emergency procedure that it is at low speed.

It is not that supersonic speeds are unattainable, but simply that we are now closely approaching a transition range from one kind of air reaction to another.

We know so very little about either the transition range or the range beyond that it is difficult now to put in exact form either the shape of future vehicles or to put into words the exact conditions which will exist.

It should be remembered that our present speeds were "impossible" ten years ago. It certainly is not very safe at the present time to operate willy-nilly in the transition range or in the high speed range. There have been and will continue to be a number of inadvertent ventures into this region and a great number of careful explorations. Such explorations will have their hazards. Undoubtedly, a great many brave pilots will be lost during the process of such exploration. The whole region of "high speed" will be apparent only when literally thousands of research projects, physical and mathematical analyses, and flight explorations have been correlated.

"High speed" is a challenge that will be beaten, but because we are only on the threshold we are apt to be over-impressed by the magnitude of the obstacles. As we get by them one by one, and as our knowledge increases, we shall look back to our present compressibility troubles and wonder what all the fuss was about. ☆



CAMP WASHINGTON d.c.

By Captain George Bradshaw

Headquarters with a capital H: Of the million-plus men in the Army Air Forces probably not more than 10,000 have passed through Headquarters in Washington.

What's Washington like? What goes on at Headquarters? How does life differ from that at your own post out there on the desert or down in the swamps?

You're familiar with a flight line and hangars and barracks and dust and a PX and possibly one colonel. Well, Washington isn't so very different from that. It's just more so. More buildings and PX's and colonels. Especially colonels. In fact, in Washington even a two-star general won't scare you after a couple of meetings. He's too likely to smile and ask you how things are going.

Anyway, there are a number of Guides to This and Guides to That for the edification of a soldier, but no one has come up with a military Guide to Washington. The reason is obvious. You can outline the rudimentary problems to be expected in quiet spots like Africa and Australia and Britain and the rest —how to cope with the jungle; fundamentals of British slang; flight characteristics of the kangaroo; how not to talk to Moslem women. But Washington—well, here are a few notes on the town and on life in it.

The Target: Washington is a little old southern city, grown out of size for the duration at least, situated in the District of Columbia—a 70-square mile plot wedged in between Maryland and Virginia. Washington is some 22 flying hours from Tokyo and 14 flying hours from Berlin. It is hot in summer, crowded all year round, and intense, if you know what we mean. Because of what goes on there many people call it the center of the world today.

The big house: No matter what brings an officer to Washington, unless it's a furlough, sooner or later he will find himself in the Pentagon Building. This is the new and already famous monster which houses the War Department, and is set on a muddy rise across the river in Arlington, Virginia. It is the largest office building in the world and properly so, to accommodate the largest business in the world.

An architectural Mr. Five by Five, the Pentagon is five sided, five storied and actually five buildings, one set inside the other. It has sixteen and a half miles of corridors, and eventually will hold some 40,000 workers. With a couple of days of orientation, after you have learned what "ring" and "corridor" and "bay" mean, you can, by using a little common sense, find almost anyone you want.

Each floor of the Pentagon is painted a different color. The second is green, the third is pink, and so forth, so you can tell at a glance where you stand. Such officers who, despite the tests, managed to slip their color-blindness past the surgeons are in a spot. They will have to be guided by the large numerals which are plastered on every conceivable open space.

The Corps of Engineers did the construction job. They moved more than 5,000,000 cubic yards of earth in grading and poured almost 500,000 cubic yards of concrete. Everything in the Pentagon runs big: 1,500 electric clocks, 650 water founts, 21,000 desks, 140,000 chairs, 200 latrines, 700 janitors and charwomen.

It's a big place, but for all practical purposes an Air Forces officer can transact almost all his business on the third and fourth floors, with an occasional mission to the fifth. There the War Birds sit and deliver.

Chow Line: You can say that everybody who works in the Pentagon has lunch there. It takes too long and you have to go too far for outside food. So, within the building there are seven cafeterias and two dining rooms. Forty-five thousand meals are served daily. For 40 cents you can get soup, meat, two vegetables, bread and butter, dessert, and a drink. And very fair food it is. In addition to the cafeterias there are six beverage bars, serving 12,000 people daily, where you can get drinks, sandwiches, apples, and so on. Figures on the amount of food consumed daily are colossal — about 30,000 quarts of milk will serve as an example. More than 750 employees are engaged in preparing and serving food.

Off we go into the wild blue yonder dept.: In winter an officer working in the Pentagon Building might conceivably spend six days a week without seeing daylight. If he lives at some distance—say a half hour's riding time —he gets up while it is still dark, arrives before the sun, works all day in one of the rings having no outside windows, has his lunch in the artificially lighted cafeteria, and goes home when it is already night. He gets two Sundays out of three off, and on those he is apt to wear dark glasses.

Latrine Rumors: During the first few weeks of occupancy, there were, naturally, numberless stories of lost persons who had failed disastrously to master simple navigation problems in the maze of rings, corridors, ramps, and bays in the Pentagon Building.

Quite hackneyed by now is the report on the fellow who entered the building a Western Union messenger and after 17 days came out a lieutenant colonel. The reverse is that of the officer who went in a lieutenant colonel and, caught in a rash of breakings, came out a Western Union boy.

Life is hurried, hectic and sometimes like this around Headquarters.

Then there is the one about the woman who went running down a ramp and tried to get past the guard without an identification pass. She said it was upstairs and she had no time to go and get it. He refused to let her out.

"You can't keep me," she cried, "I'm going to have a baby."

That still didn't move the guard.

"You'll have to have your card," he said, and then he proceeded to read her a small lecture. "You shouldn't have come in here in that condition," he said.

To this the woman replied, with some feeling, "I didn't."

Troop Movements: If you get a seat in a Washington bus or street car, you're just plain lucky. Staggered hours or not, everybody goes and comes from work at approximately the same time; only veterans of New York subway rush hours will feel at home in the pushing and shoving.

For a city its size, Washington has a very large number of taxis. The only trouble is, they are always full. On a rainy day or night you might as well pull up your pants and walk; you haven't a prayer. Doubling up is a universally practiced custom. Almost no taxi leaves Union Station any more without a full load, each passenger likely enough bound for a different destination. And each passenger pays full fare when he alights.

In connection with the Big House, 30,000 people come and go every day. About half of them use buses, the others private cars.

Visiting firemen take taxis to and fro. But not the old timers. It's six-bits at least to any downtown point.

Night Missions: In Washington, facilities for a hot time are not unlimited. Neither are women companions. There is the regulation number of bars, there are dancing floors in some of the hotels, and a moderate number of night clubs. There is no great spot of chic and glory like the Stork or the Camellia Room or Mocambo, but if circumstances require you to dance a bit and enjoy refreshments, you can always find a place. It will be crowded and pretty expensive, but that is situation normal.

Yet, the chances of your being kept awake by revelry by night or keeping someone else awake are not too bright in Washington. By midnight the streets are deserted and most of the joints shut up.

Soldiers and secretaries who have to get up at six-thirty and fight for breakfast, fight for a bus seat and then work all day require more shut eye than jive. Of course, there are always a few hardy souls who can be found somewhere drinking them up, but the average lieutenant falls exhausted into bed and longs for the peaceful days when he was a carefree corporal—if he ever was one.

Washington Mess: You won't be in Washington long before you hear the story of a man who went into a hotel dining room, sat down, carefully studied the menu, and then said to the waiter, "I'll have the three-dollar dinner." Wearily the waiter replied, "On white or rye?"

Food isn't easy to come by in Washington. There practically isn't such a thing as an empty restaurant. That applies to all price groups; if you're going to pay 45 cents or four dollars and a half, you're going to have to wait in line. When you do get a seat the service won't be electric; the waitresses are tired and often the food is, too. But you won't starve and the fare is probably a little more varied than it is in Stalingrad, to take a case.

Eating has become more of a routine matter than in the spring and summer of '42. Then everybody was new to the situation, and if they went into a crowded restaurant they left and tried another, and then another.

Now everybody waits at the first. You get fed sooner that way.

On the whole, Washington is a cafeteria town. At one time or another practically everyone serves himself. If there is a famous section of town in which to eat, it is down along the wharves, where a number of good seafood places stand.

Fox Holes along the Potomac: Where do you sleep? This is the $64 question. There are a hundred answers, none of which satisfy.

An enlisted man assigned to Washington may be attached to Bolling Field or Fort Myer. If so, he has no problem and lives much the same as he would anywhere else. But some of the boys are put on detached service and allowed to scramble for themselves. That means they must compete with the civilian population which, generally speaking, has more dough to spend. And let it be said here and now, the civilian population doesn't step aside for the military. They've seen too many uniforms to be impressed by them; it's every man for himself. But after a long hunt a man can find a boarding house, apartment, small hotel or some kind of reasonable accommodation. It will take time, and he probably won't be satisfied, and it will cost the limit he can afford, but he'll have a bed.

An officer in Washington is up against the same problem. If he's lucky he may get a dark room in a hotel for which he must pay at least four bucks a day. If he has reasonable assurance that he is to stay in the town, he may find a small apartment and collect a bed, a chair and a table. Or he may crowd up with a couple of friends and live in one of the numberless warrens which exist all over town.

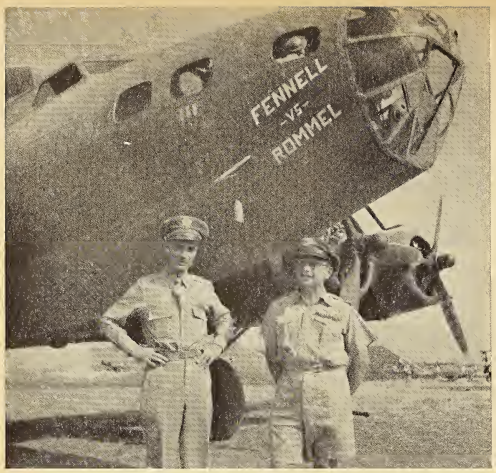
These are odd buildings which are called apartment houses and which from the outside put up a pretty good front. Inside you find bare corridors, decrepit elevators and sparsely furnished rooms, but they still cost plenty. They may, however, tend to be a lot of fun to live in, because it must be remembered that the civilian population contains a number of young females called "secretaries" who also must have a place to sleep, and who often double and triple up in such quarters.

It is reported that several introductions have been effected between the girls and boys, and on occasion soft drinks have been consumed in company. This is only hearsay, of course.

A visiting officer may have the luck to get a bed at the V.O.Q. at Bolling Field. This is a hotel that has housed the flying great of the world, from generals to second lieutenants. Originally the V.O.Q. had accommodations for 43 officers, but has been expended to 60, with an addition for 180 more now under construction. Major General Doolittle's Tokyo crew lived there, if you want references.

The meals are good, and cheap at the V.O.Q. Also, a bureau is maintained to sort out the available entertainment in town and let the boys know about parties. Clubs, fraternal organizations, sororities flood the V.O.Q. with invitations—it's not hard to dance or go out to plays or concerts.

Here's a point to remember about V.O.Q.: If you are stuck for a place to sleep, the office will attempt to get you a hotel reservation or rooms by the week or month, off the field. The Washington Hotel Association cooperates by giving priority to flying officers and emergency requests. ☆



Major General L. H. Brereton (right) and the author in Africa

We fought both NIPS and NAZIS

By Major Max Fennell

WE fought both the Japs and the Germans. For ten months, as part of the 7th Bombardment Group, we shuttled between the Middle East, India and China. We chased Germans from Tripoli to Tunisia. We bombed Crete and shipping in the Mediterranean, ran missions into Burma, and raided far behind Jap lines into occupied China. At the time, I happened to be C. O. of the 7th group's 9th squadron.

The first question everybody asks is, "Who's tougher, the Nips or the Nazis?" It's a fair question. The answer is—both.

Personally, I think the Germans are going to be harder nuts to crack than most people seem to think. It seems to me they are getting tougher instead of weaker as time goes by. When we first ran into the Germans around Tripoli, their fighters were content to make two or three passes and get out. But as we advanced, they would attack and stay with us for 30 or 40 minutes. Both the quality and quantity of their planes are holding up and their pilots are getting more daring all the time.

Don't ask me why, but some of our men rather expected the Germans to be relatively sportsmanlike in their methods of fighting. Remember those stories you used to hear of wing tipping to a fallen enemy and other displays of mutual admiration? They are definitely not true. Again and again, the Nazis—just like the Japs—would strafe our boys as they parachuted to earth.

In the North African theater, we ran up against ME109s and JU88s. That's all they seemed to have in that area but they were plenty good with those ships. Usually our bombing squadrons were outnumbered—*before* the battle. If our gunners were on the beam, the Nazis got hurt and hurt badly.

At first, the Germans came in on our tails but our turrets back there literally shot hell out of them. Their principal attacking method thereafter was a direct head-on approach. For a heavy bomb squadron there's only one good evasive tactic against the MEs and that is good gunners. The entire success of your mission depends upon your gunners—they have to know their business. We found that if a gunner put a burst out in front of enemy planes as they started to come in, it would often break off the attack. The principal thing for a gunner to watch out for is his method of shooting ahead of his target. Lead your target by twice the distance you think you ought to and you'll get hits. Those MEs are very fast, but when you put some lead in their path and show that you've got them in your sights, they will often dive away without opening up at all.

The cannon in the ME is effective at about 1500 yards and the guns are usually opened at about 750 yards. However, the guns in our 17s and 24s are effective at 1000 yards and you can always outrange them. Some of their pilots would open at 750 and keep their guns going as they came right through our formation. The only thing we could do then was turn right into them. This would cause them to break off their attack, and they would generally go under us into a steep dive.

IF you are ever caught alone, your best bet is cloud cover—and there is usually plenty of it over the North African sector. If you are caught below 10,000 feet, "hit the deck." That is, get down low so they can't dive on you.

We usually flew in three elements of three planes each. When caught below 10,000, the lead element would drop down low with the second and third elements in echelon. Even then, many MEs dove down on us but they would have to break off at ineffective distances.

The ME is quite an airplane, fast and very well armored, and it will match the 17 in getting up to higher altitudes. If your gunner has a dead eye, he'll pick an ME's engine. The JU88s are much slower and not so well protected. Of course, it is not the job of a bombing plane to shoot down fighters. You're supposed to drop your eggs and get back home. You may have heard that you can't hit a maneuverable target from 20,000 feet and higher. You sure as hell can—and with as few as nine planes, too.

I remember the day nine of us went after a troop transport in the Mediterranean. Each of us had six 1,000-pound bombs and we pattern bombed from 19,500 feet. We got four direct hits right on the deck and twelve near misses. That baby was maneuvering like the devil but we blew her up with the first salvo. No matter how maneuverable your target, if you use pattern bombing by elements you'll find that the ship just can't move fast enough to get away. We came in on a steep angle and damn few boats escaped.

Most of the boats carrying supplies to Rommel were covered with fighter protection. They would wait for us to make our runs and close in as we came up to the target. Bombardiers ought to get plenty of practice bombing on very short runs because the

The comforts of home are left far behind at this command outpost near the Tunisian front lines.

A.A. fire will get your range and it just isn't practical to make a long target run.

When flying on to the target, we used stepped-down javelin formations for better visibility and extra concentration of fire power. We generally stayed in formation, bombing in elements of threes. That formation is very maneuverable.

Occasionally, after dark, we found the Germans hanging around our fields, waiting for us to come in. However, the British had an excellent location system and they'd send up their Beaufighters. Believe me, those ships are deadly for night fighting.

The Germans did a lot of night bombing, using their JU88s. They have an excellent flare system and caused us quite a bit of trouble.

In December, we bombed Sousse and Sfax in Tunisia from an advanced field near Tobruk. Our headquarters was in Egypt and we'd move from there to the advance base and then go over the target. In our first raids we didn't find an awful lot of fighter opposition around these towns. Later, however, we ran into plenty of it—Hitler certainly pushed a lot of stuff down there to try to hold Tunisia.

I remember one thing in particular around that area. I was flying General Brereton and Sir Arthur Tedder, the British Air Chief, over Sfax at 2,000 feet. We thought it was in Allied hands and never knew until we got to Algiers that the Germans had the town!

Generally, the weather around North Africa is pretty bad. Rain halted operations for some time and gave the mechs a headache. During the Winter you'll find icing conditions about 6,000 feet over the Mediterranean. The only thing to do is try to get on top of the cloud formations.

Here's a tip for B-24 pilots. You'll find that although your ship is pretty heavy, it's a good steady plane. Be damned sure you understand the hydraulic and fuel systems. Learn them backwards before you get into combat. There's a lot of piping in a 24 and if ack ack hits some part of your hydraulic installations, you can cut it off and still get your flaps down. Be sure you know how before you try it.

Verbal snapshots about air war in China, India and Africa—by a pilot who was in the thick of it.

For quite a while, we were stationed in Palestine. It's really nice there, very much like Southern California. The weather is warm most of the time but during the Winter you're liable to run into lots of fog.

Because Palestine is populated by so many refugees, practically everybody talks four or five languages and you'll have no trouble making yourself understood. One evening we went into a night club and were informed that we were the first Americans who had ever been in there. When some of our Southern boys started singing "Dixie" we were amazed to find that the entire place joined in on the chorus. And they all knew the words, too.

Some of us were ordered into China from Palestine to do some survey work and, later, to run a couple of missions against the Japs.

GETTING into China from India is no easy job. You have to go over the Himalayas through some of the worst weather in the world. All flying is on instruments and you'll have to get up to 22,000 feet some of the way. Our Air Transport boys, pushing supplies into China, are really the unsung heroes of our war over there. Sometimes during good weather they'll make the India-China round trip every day.

If you ever get down around that territory, don't depend on the Chinese maps. Actually, the mountains are always higher than they appear on the maps. You can follow the rivers, however, for they are accurately charted.

Should you get lost over Chinese territory, all you have to do is circle the nearest village. The people will realize your circumstances and phone to the closest radio station—there's always one around—and they will let you know where you are and how to reach the nearest field.

If you are forced down in any part of China not occupied by the Japs, the best thing to do is stay exactly where you are. No matter where you go down, the alert Chinese will have seen you and they'll come after you. One plane I heard about was forced down in an almost impenetrable wilderness—it took the Chinese two full months to rescue the crew but they got them all out alive.

One of our raids while on that assignment stands out in my memory. We flew 800 miles behind Jap lines to bomb the Linsi coal mines in Occupied China. There were six B-24s on the mission, each carrying six 500-pound bombs. We were in the air about 13 hours and didn't come across one enemy fighter. We flew at 16,000 feet and came down to 14,000 for the bombing run. Over the target we ran into some AA fire which didn't do any damage at all. The power house was our target. A string formation was used, we bombed individually and all of us made two runs over the target.

The mission was arranged so that we could fly back under the cover of darkness. When we returned, the Chinese lit a flare path for us and put an AA searchlight over the field. The entire flight returned safely.

Some time later, six B-24s made an eight-hour flight from Calcutta, India, to bomb Rangoon. We didn't run into anything—neither enemy aircraft or ack ack fire. Each plane carried five 1,000-pound bombs and we hit the target from 27,000 feet. One crew had to bail out because of some electrical difficulty but we all got back safely.

China is really wonderful. We had plenty of chicken and steaks, prepared in American style by the Chinese, who are the best cooks in the world. For breakfast, we always had scrambled eggs, toast, and coffee.

One of the most revered customs in China is that of drinking tea with your host before any business is transacted. If you ever have occasion to visit a Commanding Officer of a Chinese outfit, don't discuss business until after you've had tea. But once tea is over, the Chinese go to work with a real vengeance. War is in their hearts and they'll do anything you want done. Most every place you will find an interpreter provided for your convenience.

Many of the Chinese women are very beautiful, but if you pay too much attention to the young girls, you'll find that they consider the matter a very serious one.

One of the peculiar things in China is their system of money. Under the rate of exchange, one American dollar gets you ten Chinese dollars. When the boys played poker, Chinese money was always used and it was nothing to hear somebody say, "bet you a hundred." Money was piled high on the table and the winner usually needed a knapsack to carry his money out.

One day—soon, I hope—we're going over Tokyo and that's the ride I want to be on. Once you've been in China, you learn to really hate the Japs. Please don't consider this bold—but this is my personal request to be counted in on the next Tokyo run. Nobody is fooling in China when the usual American farewell of "so long" is replaced by "See you over Tokyo." ☆

A Chinese labor army employs primitive methods to construct an airfield at an advanced base.

Crew of a B-24 study maps in preparation for a bombing raid on coal mines in Occupied China.

"In case of accident"

(Editor's Note: On Feb. 5, during a routine flight Flight Officer Wilczynski, then a Staff Sergeant, and a companion suffered compound leg fractures in a crash which killed both pilots of their plane. This is the story of how they endured sub-zero weather, exposure, and bitter disappointments, finally to be rescued. Both Flight Officer Wilczynski and Lieutenant Mahan are members of the Alaskan Wing, Air Transport Command.)

In this battered hulk, the author and his companion met their darkest hour.

MY BIGGEST worry was whether I'd ever be able to fly again. I wasn't so scared of dying as I was losing that leg. I knew a wooden-legged pilot couldn't fly for the Army, and the one thing I want to do is fly.

You know, the day we got back to the hospital here in Edmonton, I got the two best pieces of news I ever expect to hear. One was, they wouldn't have to take off my leg. The other was that my Staff Sergeant days were over—I had got my Flight Officer commission. Can you tie that—after lying up there in the snow for nearly three weeks?

You want to know what we did to save ourselves. I'll tell it the best I can because it might help somebody else in a similar jam. As I figure it, the crash happened this way: We were in a cargo ship and the Captain, Pilot John Hart of Minneapolis, was making an instrument landing because of the snow that had been falling for several hours after we headed south out of Fairbanks. We had delayed a couple of hours looking for a lost bomber which later turned up.

When we got over the field where we were landing for the night, we were up about 8,000 feet. I was standing in the companionway just in front of our passenger, Robert Alexander of Denver, and telling him about how the instrument let-down was made. The last time we went over the field, I calculate we were around 1,000 feet and losing air speed fast. I could hear the co-pilot, Kenneth W. Jones of Elyria, Ohio, calling off our speed—100, 90, 80 and so on. That was when I first got worried and thought we would crash. The last count I heard was 60 and then we stalled. We fell off on the left wing, but the Captain brought her out of the spin and she was going nose first and level when she began to clip off the trees. This made a noise like spanking the wings with the palm of your hand. Then she hit a big tree that didn't clip off. She stopped—and sudden.

I had started to back up in the companionway when I first saw we were in for it. I kind of pushed Alexander to the rear so both of us could lie down. We were flat on our backs with our feet braced, and I guess that saved us. Afterward, my left foot was so tangled in wires and controls around the instrument board that I had a devil of a time getting it loose. My head was alongside the front baggage door which had been torn off. The plane's nose was cut off from the front edge of the pilots' seats. They had been killed instantly.

MY first thought was to get out of the ship. I didn't feel any pain and didn't know my leg was broken till later. I put my hands out through the baggage doorway and tried to touch the ground but it was too far—three feet, I guess. Then I scrunched forward out of the door and let go. That's how I hurt my shoulder, which is better now.

Gasoline was leaking like it was coming out of a water faucet. I was afraid of fire. I dragged myself 10 or 15 feet off to the side and then stopped and hollered, "Anybody else alive?" There was no answer. I yelled again. Alexander, who was still in the plane, called back, "Can somebody give me a hand?" I started to crawl to the back of the plane thinking I could help him out of the rear door, which would be lower to the ground. I bumped into the trailing edge of the left wing and somehow caught some de-icer fluid in my mouth. Did it burn!

It was Arctic-dark and I was afraid to light matches. While I was lying there, Alexander found the same door I came out of. We listened to the dripping gasoline until we decided it wasn't going to catch fire and then we crawled back into the plane.

We didn't sleep that night. We figured we had crashed at 11:20 p. m. and it was a half hour later now. We were dog-tired from the shock and everything (crawling isn't any picnic as we found out later), but we were afraid we'd freeze to death if we went to sleep. Every fifteen minutes one of us would call to the other to make sure he was all right. By this time I knew my leg was busted and I wondered about that, too. What would I do with a wooden leg, anyway? Alexander didn't know his foot was hurt at first. It was numb and he thought one of his Arctic boots wasn't zippered up right. I tried to fix it for him—one of his arms had been paralyzed from a

previous sickness—and then I told him, "Your foot is broken, too."

The next day we just tried to keep warm. It was still snowing—and kept at it off and on for five days. I heard from the airport later that it was 40 below that second night. We did manage to find the Army emergency rations and we nibbled at them for all the nineteen days. For water, we ate snow. I'd scoop it off the wing through the emergency window but it was full of pine needles and bark.

When no more snow was in reach, I beat the ceiling of the plane with a shovel and knocked more of it down off the roof. We didn't get enough and we were all dried up when they brought us in. I might add that we found the Army emergency bottle of brandy. It was frozen, but at the rate of two

When you're lost for 19 days in northern snows, you can still crawl home — even with a broken leg

or three "teaspoons" every hour we finished that in one day—for frostbite, you know.

Funny how an experience like this changes your way of looking at things. Once I got a can of snow and tried to boil it on a little stove there in the plane. The hot can fell right side up on the back of my hand. Instead of jerking my hand away to keep it from burning, my instinct was to save the water. That's how I burned my hand.

We found a bed-roll in the plane and used it for a mattress. Alexander got the wing covers which we put over us and that way we kept fairly warm. Anyway, it saved us from freezing. This second night we heard airplanes go over. I discovered we were so near the field that in the quiet of the woods I could tell when they taxied out to the end of the runway and revved up the motors. It was awful to lie there in the wilderness and hear civilization pass you by. Each night several planes would go. I got to timing the take-off and would calculate how long it took them to pass overhead. I figured 120 miles per hour, counting take-off and climb, and it took them three minutes to come over. This would mean about six miles to help. We thought they'd find us sure.

Trouble was, the new snow covered up the plane. Then, too, the right wing was broken off and was (Continued on Page 32)

By Flight Officer
Eddie Wilczynski
As Told to
Lieut. Lynn C. Mahan

Only six miles from base but unapproachable from the air. Above, a view of the wreck, and at right, a sample of the terrain through which the survivors crawled for four days.

ILLUSTRATED BY CAPTAIN RAYMOND CREEKMORE

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Maj. Ge

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(1) ADVISE CG AAF
(2) ACT IN CG'S NAME
(3) SUPERVISE CARRYING OUT OF CG'S POLICY
(4) RECOMMEND NEW POLICIES AND CHANGES IN POLICIES TO CG

DEPUTY CHIEF OF THE AIR STAFF
Brig. Gen. L. G. Saunders

DEPUTY CH
Brig.

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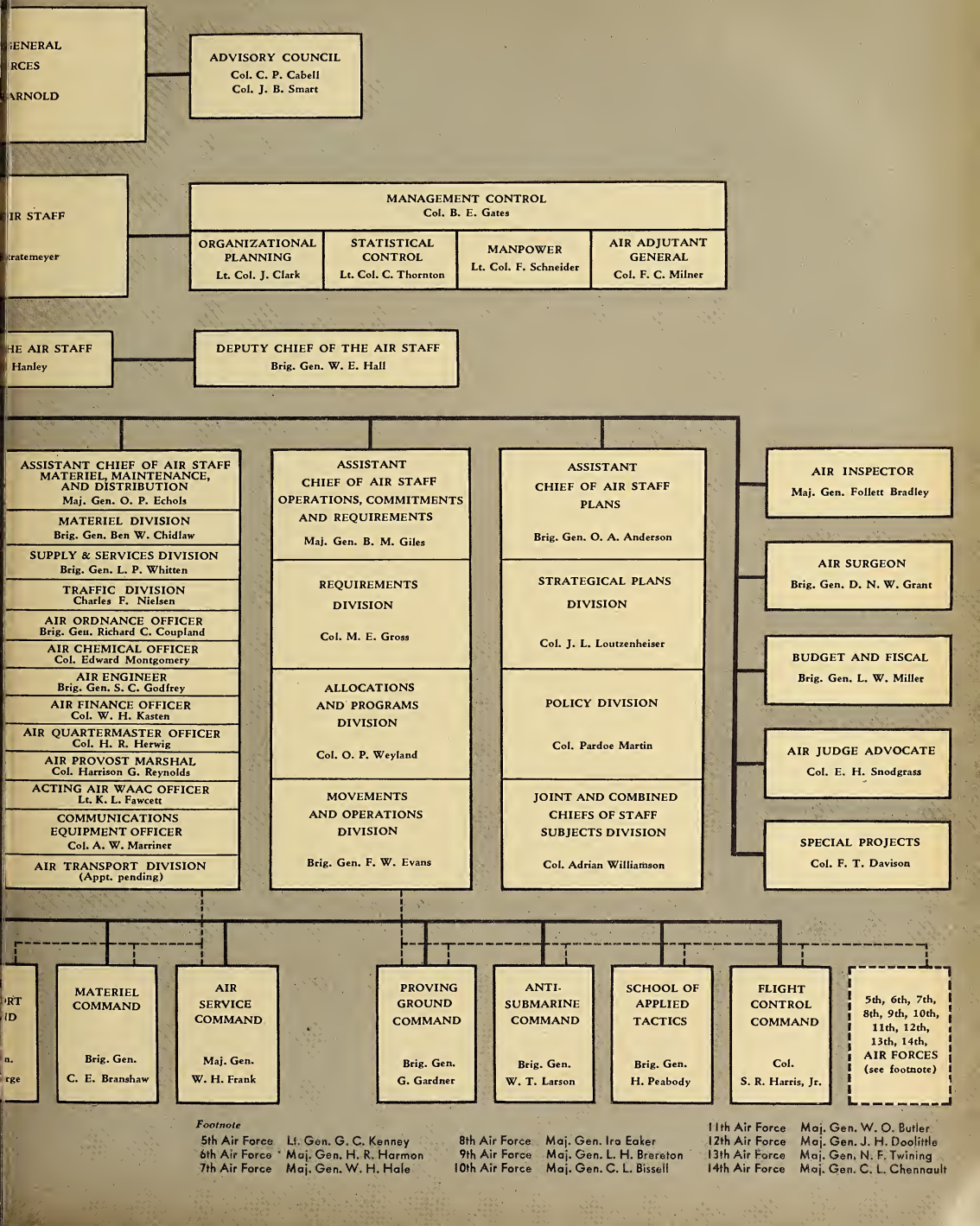
Maj. Gen. B. K. Yount	Maj. Gen. W. R. Weaver	Brig. Gen. F. S. Borum	Maj. Gen. D. Johnson	Maj. Gen. St. C. Streett	Maj. Gen. Ralph Royce (Eff. 4-18-43)	Brig. Gen. W. E. Kepner (acting)

HE ARMY AIR FORCES



Footnote

5th Air Force	Lt. Gen. G. C. Kenney	8th Air Force	Maj. Gen. Ira Eaker	11th Air Force	Maj. Gen. W. O. Butler
6th Air Force	Maj. Gen. H. R. Harmon	9th Air Force	Maj. Gen. L. H. Brereton	12th Air Force	Maj. Gen. J. H. Doolittle
7th Air Force	Maj. Gen. W. H. Hale	10th Air Force	Maj. Gen. C. L. Bissell	13th Air Force	Maj. Gen. N. F. Twining
				14th Air Force	Maj. Gen. C. L. Chennault

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Maj. Gen. H. A. George

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Maj. Gen. W. H. Frank

Footnote
5th Air Force Lt. G
6th Air Force Maj.
7th Air Force Maj.

MARCH 29, 1943

Notes from the Antilles

By Captain Charles D. Frazer

Gateway to the Americas. Since the Spaniards discovered the New World, the coral and volcanic islands of the Antilles have been recognized as the natural stepping stones to the Western Hemisphere. Conversely, in time of war, they become the natural barrier against enemy invasion.

The Greater Antilles include Cuba, Haiti and Dominican Republic, Puerto Rico and Jamaica. Well-known among the Lesser Antilles are such British possessions as Antigua, St. Lucia, Barbados, and Trinidad, and the French colonies of Martinique and Guadeloupe.

This vast loop of islands from Florida to the South American coast is today guarded by both Army and Navy forces—and by the Antilles Air Task Force, part of the over-all Caribbean Command, headquarters of which is in Panama, Canal Zone.

Some bases of the Antilles Air Task Force are modern, permanent stations. Some are small, remote, one-runway affairs, hemmed in by jungle and bamboo forest. Together, manned by fighter and bombardment squadrons, they are like a chest stuck out into the Atlantic against enemy air or sea attack on the vital approaches to both Americas, the Caribbean and the Panama Canal.

Covering the waterfront. Squadrons based on the Antilles are of two types. Defensive and offensive. Fighter squadrons, equipped mostly with P-39s and P-40s, carry on the defensive work, with constant patrols and other tactical missions.

Bombardment squadrons are organized to hunt U-boats. This is the most important function of the Antilles Air Task Force, since the submarine is a vicious, ever-present menace to shipping through the Caribbean. Subs have even shelled some of the islands.

All Army air operations are carried on in full cooperation with Navy surface vessels and PBYs. Tactical plans are developed by joint commands and control is exercised by collaborating Navy and Army officers at various headquarters.

The large fields in the Caribbean area serve also as important way stations for the Air Transport Command and through them passes the greatest volume of military air traffic of any region in the world.

International set. There is, for example, Borinquen Field, Puerto Rico.

The bar of the Aquitania never in its palmiest days boasted a more colorful international clientele than does the Officers' Club bar at Borinquen. Elbowing and shoving their way up democratically for a rum-coke or a daiquiri may be seen foreign diplomats and military aides, ferry pilots and war correspondents, "brass hats" of all the United Nations and ordinary seamen—survivors of torpedoed ships—dressed in the garb of the rescued sailor, a cheap seersucker suit.

In the passing parade at Borinquen, you can see a wider variety of uniforms than in an operetta. Combat and ferry pilots of the Army Air Forces mingle with flyers from Britain, the Netherlands, Free France, China, Russia, and many other nations. Prominent in the crowd will always be the gay and vivacious airmen of Latin America.

Not all celebrities are uniformed, by any means. A sombre business suit may call attention to a Wendell Willkie or a screen actor on U.S.O. tour or other globe-trotters, en route to or from the States.

Conversation takes place in so many languages in this Club that, to a casual listener, it sometimes sounds like a Berlitz school gone mad.

For foreign notables and general officers, Borinquen has special quarters near the Officers' Club. For lesser travelers, there is a spacious Hotel de Gink with a sign at its door reminding all comers to unload firearms before entering. Sleep is not easy to come by in these visitor quarters, because early starts are the rule, regardless of whether a ship is coming from or going to the States. From two or three a.m. on, alarm clocks are going off and people are stumbling around in the tropical dark. An hour after sunup, most transients will have left Borinquen.

So near, yet so foreign. Duty in the Antilles is foreign duty in every sense of the word. Thus, life is apt to be both interesting and difficult.

While only a wing-tank hop from the U. S., many of these islands present all the discomfort and primitive problems of a nook in the Southwest Pacific.

Malaria, venereal disease and amoebic dysentery are Three Horsemen of the region. You sleep under mosquito bars in many places and drink only boiled or purified water.

Drainage is a serious matter, for in this world of soft, green hills and dazzling white beaches some rain falls nearly every day. Everyone agrees that engineers attached to Air Forces units have had a difficult job and have done it well.

Scenes from Somerset Maugham. In these islands you can find all the authentic "atmosphere" of a tropic novel.

Lush jungle presses in upon barracks and airfields, native thievery and mystic doings are not unknown, and there is an engaging variety of snakes, ants, parrots, monkeys, and other fauna.

Snakes, particularly. There are tiger snakes, black on top, bright yellow underneath, handsome and deadly poisonous. The coral snake is another bright-colored beauty, frequently found swimming in the pale blue water of the Caribbean. It is known as the "15-minute snake," since that's about par after a nip or two.

At one field a 23-foot anaconda was killed less than 50 feet from a Captain's quarters. This delicate specimen has been known to crush a cow in its coils and swallow the victim whole. Usually, however, the snake will reconnoiter in a two- or three-mile radius before the meal, to be sure that no army ants are near. These ants are something. Parasol ants of the army ant family sometimes travel in crawling masses 20 feet high, devouring everything in their path.

Planes vs. Jackasses. One airfield is especially bad at night when its runway becomes crowded with the wild jackasses abounding on the island. They can be chased away, of course, but they scamper back with all the stubbornness of a jackass to make landings hazardous.

Flying weather on the Caribbean Sea Frontier is generally excellent. Rain moves in squalls and you can fly around it or stay up till it stops. Afternoon usually brings some mists but most of the average day is CAVU.

Trouble, however, is likely to be real trouble. Most flying is done over limitless reaches of water. A forced landing may bring you down on the sea, in which case you will have to contend with a terrific tropical sun and with sharks and barracuda.

Down here, there is no academic nonsense about whether sharks will attack a man or not. People anxious to live don't test the question. If they swim in the sea at all, they learn to pick a shallow bay well protected by reefs.

Or you may be forced down in the jungle, which is worse. Much of it is trackless and impassable. Revolvers, knives, axes, emergency rations, water purifiers, emergency radio equipment—all these things are as important to a Caribbean flyer as his parachute.

Languages, Dialects, and Double Talk. An Air Forces man stationed in the Antilles must soon acquire some knowledge of languages. On many islands, Spanish is the common usage. Other spots in the Indies are more difficult.

So polyglot is the population of one island, for instance, that there are 15 to 20 different languages and dialects in which a native can feign to misunderstand you.

Pidgin English can get you by, in most cases. Some of the natives have developed a medium of conversation known as "talkee-talkee" which is enough to help you get laundry done.

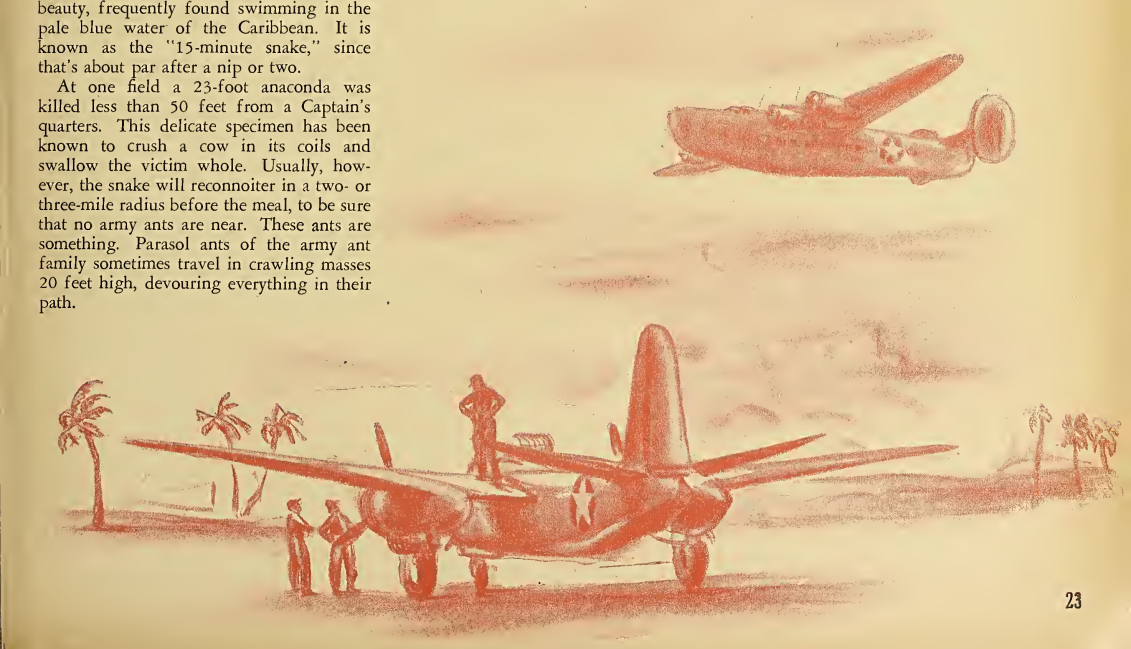
Incidentally, the laundresses of one island caused a bit of trouble at the beginning. They were accustomed to wash clothes in a very simple manner—by standing in a river stark naked, from the waist up, at least, to do the washing. This spectacle resulted in a number of man-hours lost among inquisitive G.I.s until the girls were prevailed upon to wear a little something over their impressive chest formations.

The double emphasis of talkee-talkee seems to fascinate the people of the Caribbean, for they use the trick to describe many things. A famous tree, for example, is the "divi-divi"—a strange looking growth with its upper branches and leaves standing out at right angles to the trunk, due to the constant pressure of 40-mile trade winds.

Nowhere in the world, probably, can there be found people of such varying colors, religions, and races as in certain of the West Indies and local customs are frequently quite odd.

Virgins. You know you're a long way from home when you discover that Hindu virgins are advertised to the passerby.

There are many Hindus in these islands and almost every tiny front yard has its bamboo flagpole. *(Continued on Page 32)*



Why BLACK-OUT?

By Major G. W. Holt

FLIGHT SURGEON

FLYERS learn early in the game that one of the important stresses affecting the human body in modern high-speed aircraft is acceleration. The forces produced in some maneuvers act with dramatic suddenness and result in momentary though profound sensory and physiological effects.

Acceleration may be defined as the rate of change of velocity in direction or magnitude, or in both. It is most simply thought of in terms of the accelerations of gravity.

Any body having mass and located in the earth's vicinity is attracted to the earth by the force of gravity. This force is such that a body falling toward the earth would accelerate—were it not for air resistance—at a rate of 32.2 feet per second for each second of fall.

This magnitude of the acceleration of gravity—represented by the symbol G—is a convenient unit with which to measure acceleration.

Because the law of gravity holds true only when an object is falling through a vacuum, a parachutist free-falling through the air with chute unopened does not accelerate in exact accordance with the law of gravity. The resistance of the air is such that in free-falling from a stationary blimp, one's speed would increase to about 120 miles an hour and then remain constant.

This constant velocity results because the force of gravity and the force developed by the air resistance are equal and oppositely directed. The constant velocity of free-falling is referred to as terminal velocity.

Speed in itself is a much less important flying stress—from the standpoint of physiological effect—than a change in direction or magnitude of speed. A plane diving at a constant speed of 650 miles an hour causes no sensation when the pilot is protected from the slip stream. Only when there is a change in direction or magnitude of the 650-mile-an-hour dive is a sensation produced.

A full explanation of the forces of acceleration developed in flying is apt to become very complex. To simplify the discussion, three general types of acceleration may be considered: linear, radial and angular.

Angular velocity is measured in degrees of a circle traversed per second. Thus, the second hand on your watch goes around a complete circle (360 degrees) every 60 seconds; its constant angular velocity is six degrees per second. If this angular velocity were to increase by a certain number of degrees each second, we would refer to the motion as angular acceleration.

A man sitting in a revolving chair can be turned at a constant angular velocity without experiencing any sensation if his eyes are closed. However, if the angular velocity is changed (as in starting and stopping the chair) so that the man is subjected to an angular acceleration of at least three degrees per second each second and for a period of at least five seconds, definite physiological effects are produced.

How acceleration creates unusual sensory and physiological effects in flying personnel

Consequently, whenever aircraft motion is such that a pilot is turned around an axis passing lengthwise through his body (as in a revolving chair) he may suffer adverse physiological effects that are caused by stimulation of the organs of equilibrium located in the internal ear. Actually this reaction seldom occurs except during a spin.

The radial and linear accelerations, however, are encountered in sensation producing degree with regularity. In general, radial acceleration is present in circular flight; linear acceleration, in level operation.

For the purpose of illustration in this discussion, we will consider that the pilot and other personnel are sitting upright in the aircraft.

IN linear acceleration, the speed of a plane is changed not in direction but only in magnitude. An example is the acceleration experienced in a ground run prior to take-off. Linear deceleration occurs in a landing ground run. The rate of change in magnitude of the velocity here is so small that little if any sensory effect is produced. However, linear acceleration may reach sensation-producing, and even dangerous, magnitudes in catapult take-offs and crash-landings. Thus it is seen that linear acceleration and deceleration occur in straight line paths of motion. Dangerous linear decelerations also occur on opening a parachute immediately after bailing out from a plane diving at speeds very much greater than the terminal velocity of 120 m.p.h. and in crashes.

On the other hand, when a plane follows a circular path, the plane and its occupants are subjected to a centrifugal force directed along the radius of the curved path. This centrifugal force is that of radial acceleration and is developed in most aerial acrobatics involving high-speed circular flight and especially in rapid recovery from a power dive.

The effect of this centrifugal force on the human body depends on four factors:

1. Magnitude of acceleration, or number of G's developed.
2. Direction in which the acceleration acts.
3. Length of time the acceleration lasts.
4. General condition of the individual.

Thus in recovery from a power dive, the extent to which the pilot is affected depends on the number of G's developed, the direction in which forces of acceleration are applied to his body, the length of time he is subjected to these forces, and his general physical and mental stamina at the time.

Positive acceleration refers to accelerative forces which are applied from head to foot, such as those produced in a sharp recovery after a steep dive. The physiological effects of positive acceleration consist of such dramatic episodes as grey-veiling of the field of vision and black-out.

In sufficiently severe positive accelerations, with a high number of G's and a duration of many seconds, there may be momentary loss of consciousness—and the individual may not necessarily remember the loss. This fact has been proved to pilots who insisted they did not lose consciousness by showing them cockpit motion pictures of themselves in such an unconscious state.

In recovery from a dive or sharp pull-up, the body is pushed upward by the airplane and moves with the ship. The blood in the vessels, particularly the great veins in the abdomen, reacts as a fluid within a distensible system of vessels and thus tends to col-

lect in a pool in the veins of the extremities, abdomen and pelvis. The blood is not able to return to the heart, and X-rays have shown that in such maneuvers the heart is practically empty during the acceleration.

The heart thus is prevented from pumping any oxygenated blood into the arterial circulation and, therefore, little if any fresh blood reaches the brain. Blood pressure decreases rapidly in the arteries of the neck, brain and eyes.

The structure of the eyeballs is such that it contains fluid under pressure. This pressure within the eyeball normally has to be exceeded by the blood pressure in order to supply the eye with arterial blood. Since the eyeball requires normal blood pressure for vision, it naturally follows that sight will fail in high positive acceleration maneuvers. Moreover, the blood supply to the eyes is more profoundly affected by positive acceleration than is that to the brain tissues due to the intra-ocular pressure working against the blood pressure. For this reason loss of vision occurs before loss of consciousness.

THE threshold value for positive acceleration—that is, the magnitude and duration of the acceleration which causes the average individual to black-out—is thought to be about 5.5 G's for four or five seconds.

Such acceleration has other effects on the body. Since the body reacts according to its weight, the number of G's multiplied by the individual's weight will give the relative reaction in a given positive acceleration. For example, if a pilot weighing 150 pounds pulls out of a dive with five G's, his relative body weight and the pressure he exerts on the seat will be 5 x 150, or 750 pounds. The blood also will exert pressure in the direction of head to foot as though it were as heavy as mercury at one G. In high G maneuvers a pilot's body may be momentarily immobilized due to the forces produced in the acceleration involved. After violent acrobatics, some flyers have experienced a complete temporary inability to move or lift their hands or feet.

These physiological effects of high positive G are temporary, and are not regarded as having any permanent untoward effects on the individual. They are just a part of the day's work. Nevertheless, these effects do represent a potential menace in combat. Many anti-G mechanisms are being studied with the purpose of preventing greyveiling black-out and loss of consciousness.

One device consists in the alteration of the pilot's position by using a tiltable seat. This seat tips backward as the ship begins recovery from a dive and the pilot lies in the long axis of the aircraft. The forces of positive acceleration consequently are directed at right angles to the long axis of the pilot's body. The pooling of blood and delayed filling of the heart are minimized and black-out is proportionately decreased.

Another means of increasing an individual's tolerance to positive G is for him to assume a crouch position. This move is made relatively easy by placing a step on the rudder bars. Crouching reduces the length of the venous column of blood above and below the level of the heart, thus facilitating the return of blood to the heart and increasing the ability of the heart to pump blood to the eyes and brain.

Negative acceleration occurs in maneuvers in which the forces are directed in the long axis of the body from seat to head, or in the opposite direction to those of positive acceleration. Forces of negative acceleration are developed in such maneuvers as push-downs, outside loops, outside spins and inverted flying.

In negative acceleration, since the force is directed from seat to head, there will be a pooling of blood in the head. With high negative acceleration in the neighborhood of three to five G's, suffusion of the face, congestion of the conjunctival membranes of the eye, and redding of the fields of vision may occur. Rupture of a cerebral blood vessel has been produced.

Transverse acceleration refers to an acceleration in which the forces are applied transversely across the body. Since this type of accelerative force is applied in a direction at right angles to the long axis of the great blood vessels, there is a far less tendency toward the pooling of blood in one end of the body. For this reason, much greater transverse G can be tolerated than positive or negative G. The tiltable seat changes accelerative forces from positive to transverse.

High transverse G may occur in catapult take-offs and crash-landings. Although it is true that the tolerance to black-out is greater with transverse than with positive G, injury can result from either catapult take-off or crash-landing if proper protection is not taken against impact deceleration.

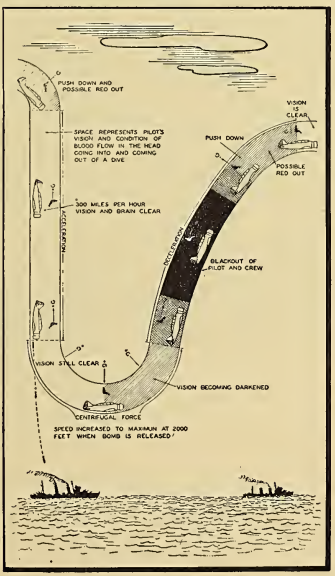
Retarded acceleration, properly spoken of as deceleration, is an important consideration of crash injuries. Most fatalities in plane crashes, excluding burns, are due to sudden impact injuries to the head. The resultant concussion frequently prevents a plane's occupants from escaping before the ship catches fire.

In crash landings at sea, concussion resulting from impact head injury has frequently resulted in the drowning of personnel. Thus it can be seen that high G values of deceleration and the resultant effect on the head and brain are of primary consideration. By conversion of high G decelerations of the head to low magnitude decelerations, it is possible to prevent concussions and many severe—and often fatal head injuries in crashes.

A simple means of decreasing the high G of impact head injuries is to place the arms against a portion of the plane's structure and rest the side of the head firmly against the arms. A parachute pack between the structure of the ship and the head is also effective in this respect.

Occupants in the tail or rear cockpits frequently walk away from crashes while those in the front compartments are killed or gravely injured, due to the fact that less deceleration is sustained in the rear portions of aircraft. Other safety methods by which high decelerative injuries must be reduced include recessing all projections, especially those with small surface area; increasing the surface area of any projecting instrument or knob which cannot be recessed, and covering projections with sponge rubber. Crash helmets are also effective. Such methods of improvement are always being studied and applied by aircraft manufacturers.

The chart below illustrates the effects of acceleration, deceleration, centrifugal force and "push down" on pilots of dive-bombers.



CONCLUSIONS:

1. Acceleration is of primary importance in consideration of flying problems.

2. Threshold or black-out tolerance to positive acceleration is about 5.5 G's for four or five seconds for the average man.

3. Negative acceleration sustained in outside loop maneuvers is dangerous in excess of three G's.

4. Tolerance to acceleration is partially dependent on general physical condition of the individual.

5. By assuming a crouch position or by using tiltable seats or other anti-G devices under development, flyers can increase their tolerance to acceleration.

6. Deceleration of high magnitudes is a major cause of serious—and often fatal—head injuries, the resultant concussion frequently preventing occupants from escaping crashed ships which burn, or sink at sea.

7. Measures may be employed in reducing magnitude of deceleration in head injuries to a point where such injuries are negligible. ☆

ON THE LINE

WHAT'S WRONG WITH THIS PICTURE?

HERE are a few maintenance boners that always follow light aircraft—fighter planes included. "If you're a keen observer, you'll immediately spot six, yes, six mistakes—all due to carelessness and all easily correctable," said Staff Sergeant Raymond C. Raduege who selected this month's boners.

The picture above was posed by (left to right) Pfc. Sidney Wachtel, Sergeant Harry C. Hartleben, Staff Sergeant Francis M. Seitz and Staff Sergeant George S. Jonas, all of Headquarters Squadron, Air Service Command, Patterson Field, Ohio. The answers, if you need them, are on the opposite page.

A monthly roundup and exchange of hints for mechs — some old, some new — in the interest of better maintenance.

Technical Data from Manufacturers

Have you ever wondered why your letters to Airplane, Engine and Accessory manufacturers requesting books or other technical information often go unanswered? If so, here is the answer.

The manufacturers have all been instructed to forward to the Air Service Command for necessary action all requests from service activities for technical data.

Manufacturers are obligated by contract to supply technical data to the Army Air Forces. In supplying this technical data and revisions as necessary, the contractor fulfills his obligation to the government. It then becomes the responsibility of the Air Service Command to reproduce the material and supply it to the service. Quite frequently the equipment is altered by the Army Air Forces or specific instructions for the operation or repair are changed.

Obviously, then the technical data as supplied by the manufacturer must be reviewed and edited before release to the service. In the case of Technical Orders, these data are published and become a part of the Technical Order file and are listed in the Technical Order Index (T.O. 00-1) which is published monthly and lists all active Technical Orders, Charts, etc.

Technical Orders are distributed to all activities of the Army Air Forces according to the distribution table in T.O. 00-25-3, which also gives specific instructions for requisitioning additional copies. Drawings are distributed in accordance with AAF Regulation 5-17. That regulation also outlines the procedure for requisitioning drawings.

All of your questions regarding maintenance, repair and operation of Army Air Forces equipment can and will be answered if you direct them to the right place.

Rubber Conservation . . .

You men ON THE LINE can be a great help in the vital rubber conservation drive! Here's a ten (10) point program that will really save rubber:

1. Prevent oil leakage and spillage on tires.
2. Keep tires properly inflated.
3. Inspect casings for early failure.
4. Keep runways clear of debris.
5. Use proper tools in mounting and dismounting tires.
6. Mount late production tires on fast planes.
7. Discourage improper braking on airplanes.
8. Maintain inspection routing on tires.
9. Protect casings standing in the sun from deterioration.
10. Take precautions on the proper storage of rubber articles such as bullet sealing gasoline cells, life rafts, de-icers and bullet sealing hose.

Jack Notes

For your own safety, it's imperative that the capacity of all jacks be marked. Stencil the information right on the main barrel; this will prevent picking up a low capacity jack when a high capacity is needed! You'll find this especially helpful in the case of the one and one-half and five ton jacks which look so much alike. Incidentally, over-loading jacks that do not have safety valves is especially dangerous to personnel and equipment.

(T.O. No. 01-65BC-1)

There's no need to tell you of the results of carelessness around whirling props. You know the story!

Mistakes on Opposite Page

Reading from left to right

1. No, no, no! Never lift an airplane by means of the stabilizer. Use your head—not your shoulders; you'll dent the leading edge and perhaps warp it out of shape. Take it easy there, you on the end; that stabilizer tip is fragile. This type airplane should be raised by means of a lifting bar inserted through the hole provided and marked for that purpose. Reference: Common sense.

2. Look out above! You men are going to crumple that rudder and, at the same time, slice through the de-icer boot or smash the landing light on the C-53 wing right above you. Move your plane forward before you raise it and always be sure it is in the clear. Reference: More common sense.

3. Did you catch this one? Airplanes should never be parked in this position. He calls attention to T.O. 00-15-1 in reference to the radio antenna and to T.O. 08-5-2. It is possible that intentionally or accidentally someone may turn on the radio switch. With the antenna being within twelve inches of another airplane, sparks may jump across, starting a serious fire.

4. Watch your foot, big boy. That oil spot on the floor is an invitation to a broken leg or other personal injury. Grease and oil on hangar floors should be cleaned up immediately.

5. How about those shoes being worn by Pfc. Wachtel and Sergeant Hartleben? Flying boots are for flying—not for hangar or ground work. Refer to AAF Regulation 65-23 dated July 2, 1942, and you'll find the complete details in paragraph nine. In fact, the entire regulation will tell you lots of things you should know about Flying Equipment. Why not read it?

6. Wait a minute; are you kidding? That's definitely the wrong horse to use. It's a wing truss with the top slanted at a sharp angle; the fuselage will not be very steady or safe on that type of stand.

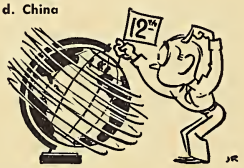
What's your AIR FORCE I.Q.?

We're off, and the questions ahead look tough. Are you on the beam this trip? 100 is perfect—and very unusual; 90 is excellent; 80 is good; 70 is passing; 60 or less—and you're grounded! Answers on Page 40.

1. ***The C-54 is a ..... engine ..... plane with a ..... retractable landing gear***

2. ***The Andreanof Islands are***
   a. In the Mediterranean, off the boot of Italy
   b. Five hundred miles west of Murmansk, Russia
   c. In the Aleutian chain
   d. North of Japan, between Vladivostok and Tokyo

3. ***The 12th Air Force is at present based in***
   a. England
   b. Africa
   c. India
   d. China



4. ***What is the most obvious criticism of this report: "I was flying a C-46 and sighted three Me 109s. I climbed to 25,000 feet and dove at them out of the sun"***

5. ***When saluting a senior in rank, you should bring your hand down***
   a. When six paces past the senior
   b. Immediately, with precision
   c. When you feel like it
   d. When the salute has been returned

6. ***When marching at double time, the command: "QUICK TIME, MARCH" changes the rate of step from 180 to***
   a. 200 steps per minute
   b. 120 steps per minute
   c. 90 steps per minute
   d. 100 steps per minute

7. ***The cargo version of the B-24 is the***
   a. C-56 c. C-78
   b. C-87 d. C-54

8. ***The R.A.F. Bomber Command is headed by***
   a. Air Marshal Sir Arthur T. Harris
   b. Prime Minister Winston Churchill
   c. Lord Beaverbrook
   d. Air Vice Marshal Sir Arthur Tedder

9. ***At the position of ATTENTION, a soldier's heels are together on the same line and his feet are turned out equally, forming an angle of***
   a. 20 degrees c. 45 degrees
   b. 30 degrees d. 60 degrees

10. ***Torque effect can be defined as***
    a. The reaction from typhoid shots
    b. The effect of strong headwinds
    c. The tendency of a plane to roll in the direction opposite to that of the prop rotation
    d. The tendency of the center of gravity to shift after a wing tank is empty

11. ***Which of these planes is best known as the Stuka dive bomber?***
    a. Heinkel 177
    b. Junkers 87
    c. Focke-Wulf 190
    d. Junkers 86

12. ***The tropopause is***
    a. An emergency landing field in the tropics
    b. The tradition of initiating ship passengers crossing the equator for the first time
    c. A rest period prescribed for flyer fatigue
    d. The boundary between the troposphere and the stratosphere

13. ***If you were ordered to shoot "pigeons" you would be going***
    a. On a strafing mission against the Japs
    b. Out to the skeet range
    c. To intercept enemy messenger pigeons
    d. On sub patrol

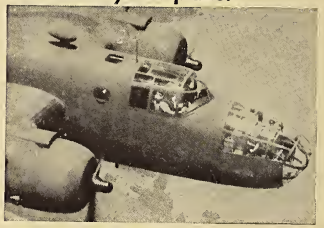
14. ***In a string of .50-calibre cartridges, the tracer projectile tips are painted***
    a. Green c. Blue
    b. Red d. Yellow

15. ***If you landed in Henderson Field you would be in***
    a. Cairo
    b. Port Moresby
    c. Guadalcanal
    d. Honolulu

16. ***When a pilot is flying the "iron compass" he is***
    a. Traveling by rail to a new station
    b. Flying on instruments
    c. Diving on tanks
    d. Following a railroad track

17. ***Which of these words is out of place in this group?***
    a. Barograph
    b. Thermograph
    c. Cardiograph
    d. Hygrograph

18. ***Identify this plane:***



19. ***Identify this plane:***

20. ***Identify this plane:***

DON'T JUST STAND THERE— Say Something!

A working knowledge of foreign languages is easy to acquire and might some day save your life

So the day finally arrives and you find yourself, not in California, but in Cairo or Canberra or Chungking or Christmas Island. You've got a lot of problems both in tactics and supply. You want to get things done, you want to ask questions. Some of these questions can be answered only by natives. But how do you talk to the natives?

The Educational Branch, Special Service Division, A.S.F., has thought about that. Already they have worked out, in understandable form, a method for soldiers to conquer 25 languages and dialects. In a short time there will be 15 more. These languages range from German and Japanese to Fante (Gold Coast) and Hausa. For the most part, this material is prepared to be inserted in the back of the Soldier's Information Manuals ("Short Guide to North Africa", "Short Guide to Great Britain", "Short Guide to Australia", and so forth).

But aside from this, Special Services have put a good deal of the material on phonograph records, which may be obtained by any group desiring to study a language. They are accompanied by mimeographed sheets of essential assistance in listening to the records. The sheets are divided into three parts: 1. "Hints on Pronunciation." 2. "List of Most Useful Words and Phrases," which is composed of the words given on the records. 3. "Glossary," containing words and phrases not included on the records.

The first section, "Hints on Pronunciation," presents a few simple rules for the pronunciation of vowels, consonants, and accents, and the nearest equivalent English sounds they represent. It furnishes a method of writing any language so that one representation and only one occurs for every significant sound in the language.

The second section, paralleling the material on the records, contains a list of the most useful words and phrases needed by soldiers, to be thoroughly memorized.

The third section of the language material is a glossary of additional words and phrases. These words are not given on the records, but with the aid of the "Hints on Pronunciation" and of the records themselves, it should be easy to master them.

These records and written materials do not attempt to teach the grammatical principles of a language; they do teach the soldier to make simple statements and ask simple questions. With a few hours of conscientious listening to the records, and study of the written material, a man will be able to understand simple greetings and general phrases, to ask directions and to have a slight but practical vocabulary that will stand him in good stead when need arises.

Not only will a man feel less strange if he can understand what is said to him and pass the time of day with people of the country, or if he can ask for a glass of beer, or find out where the latrine is; but understanding even a little of the language of the country may mean actually the difference between life and death.

In any event, even a limited ability to meet the ordinary social situations will greatly increase the cooperation given our troops by the people with whom they are billeted. There is probably no quicker way of proving your good intention to a man than by trying to speak to him in his own language.

The presentation of the records follow a very simple plan:

First, a word or phrase is given in English and is followed by the word spoken by a native using his own language. After a pause in which the soldier has opportunity to repeat the word aloud, the foreign word is repeated, as is the pause provided for the soldier to repeat again. This gives an opportunity for the soldier to hear the words and phrases twice and to repeat them twice.

Vowels and consonants are given on the records with their approximate English equivalents so that the listener can imitate the sound he hears.

The introductory vocabularies are practically the same in all languages and dialects.

As a concrete example of the way in which these languages are taught, some of the "most useful words and phrases" taken from the material on Melanesian Pidgin English accompany this article.

Melanesian Pidgin is spoken in much the same way in New Guinea and through the islands south and east of New Guinea, all the way to New Caledonia. It is not to be confused with the other Pidgin—Chinese—which is quite a different language. NOTE: In general, your pronunciation of words which are the same in English and Pidgin will be understood by the natives. However, you will notice that their pronunciation might sound very strange to you. But it will not be too difficult to get on to. Pidgin has a peculiar whining sort of intonation. This is quite easy to imitate and very important. ☆

When you mean . . .	Say . . .
I om an Americon soldier, I am your friend	Me mon belong 'Merico me perehn belong you
Food	Koi-koi
Bring some food	Bring-im koi-koi ee come
Bring some drinking water	Kiss-im woter belong drink ee come
I am hungry	Me hungry
I om sick	Me got sick (ond point to the affected part)
Where can I sleep?	Me can sleep long wuh-name place?
Where is the villoge?	Where stop ploce belong ko-no-ko
Yes	Ee got; or no-wuh-nome or yes
No	No-got; or no
Understond	You sovvy
I don't understond	Me long long
Where is	Where stop; or ee stop where
You come ond show me the rood	You come line-im me olong rood
I wont some firewood	Kiss-im some pello pire-wood, ee come
Bring it	Kiss-im, ee come
Mosquito net	Tow-nom (porticulorly in Robaul area)
Villoge interpreter	Tul-Tul ("u" os in "put")
Come quickly	You come hurry-up
Come here	You come
Go quickly	Run you go
Where ore you going?	You go where?
Milk	Soo-soo
Eggs	Kee-au
Notive tobacco	Brus ("u" os in "put")
Yesterdoy	Assaday
Today	Now
Tomorrow	Tomorrow
Doy ofter tomorrow	Hop tomorrow
Doy before yesterdoy	Assaday bepore

Sgt. L. C. Rambo

Capt. W. T. Cherr

Sgt. R. G. Ryan

Major J. A. Rouse

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DISTINGUISHED SERVICE CROSS

MAJORS: William G. Benn, Algene E. Key, Allan J. Sewart, Jr.* **CORPORAL:** Ivan W. Henderson.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERALS: Lewis Brereton, James E. Chaney. **BRIGADIER GENERAL:** Laverne G. Saunders (Also Silver Star). **COLONELS:** Everett S. Davis, Uzal G. Ent, Paul B. Wurtsmith.

SILVER STAR

MAJOR: David L. Hill. **CAPTAINS:** Rob Roy Carruthers (Also Distinguished Flying Cross with Oak Leaf Cluster), Graham Gammon, Paul H. Payne (Also Oak Leaf Cluster to Silver Star), Jay P. Thomas, Manford K. Wagnon (Also Oak Leaf Cluster to Silver Star), Carl E. Wuertele. **LIEUTENANTS:** George W. Chandler, John J. Heard, Jr., John G. Hemans, John F. Hopkins (Also Oak Leaf Cluster to Silver Star), Charles E. Norton, Albert J. Progar, William H. Roe (Also Distinguished Flying Cross and Air Medal), Wayne W. Thompson, Homer W. Vail, Frank T. Waskowitz, Clarence M. Wilmarth. **WARRANT OFFICER:** Anthony A. Albino. **TECHNICAL SERGEANT:** Charles M Noble. **STAFF SERGEANTS:** James E. Briggs, Daniel L. Cross, James F. Gates (Also Air Medal), Eino S. Hamalainen (Also Air Medal). **SERGEANTS:** William L. Hammack, Richard C. Inman. **CORPORALS:** Roger W. Ferguson, Robert A. Fries, Joseph D. Lillis, Walter E. Stephanik (Also Purple Heart and Air Medal), Joseph H. Wood. **PRIVATES FIRST CLASS:** Henry Majeski, Leroy Payne.

OAK LEAF CLUSTER TO SILVER STAR

MASTER SERGEANT: Meyer Levin. **SERGEANT:** Kenneth A. Gradle (Second Oak Leaf Cluster to Silver Star). **CORPORAL:** James C. Underwood.

* Posthumous.

PURPLE HEART

MAJOR: William C. Addleman. **LIEUTENANTS:** William B. Adams, Jr., Robert L. Ager, Willis W. Burney*, Wesley E. Dickinson, Forrest D. Hartin, Elton C. Hefley, Gilbert S. Portmore (Also Air Medal). **WARRANT OFFICER:** Philip K. Head. **STAFF SERGEANTS:** Franklin E. Abbott (Also Air Medal), Lucas L. Achay, John J. Hudjera. **SERGEANT:** T. E. Roberts. **CORPORALS:** William E. Irons, Russell D. Johnson (Also Oak Leaf Cluster to Purple Heart), T. C. Luczyk. **PRIVATES:** Theodore A. Alleckson, Floyd A. Northam, T. W. Ryan, H. J. Tiffany, R. P. Vidoloff, Charles W. Wells, Hugo I. Wiener.

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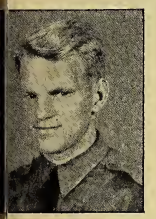
ROLL OF HONOR

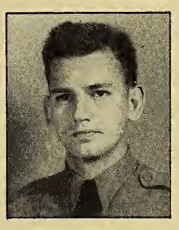


Clarence Wilmarth

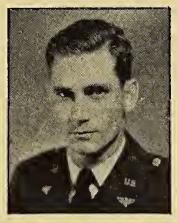
Lt. J. T. Jarman

Capt. J. P. Thomas

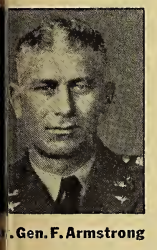
t. B. B. Southworth



Lt. J. J. Heard



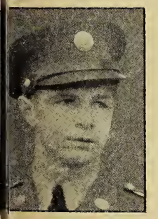
Major H. J. Holt



. Gen. F. Armstrong

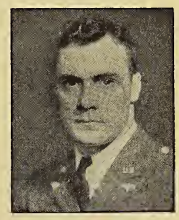
Lt. R. S. Gustke

Lt. Howard M. Crow



t. A. M. Bloshko

Lt. Col. J. S. Chennault



Capt. J. H. Moore

Jack C. McIntyre, George Oxrider, Charles W. Peterson, William R. Ross, Francis E. Widman, Marion J. Wood, Marshall A. Younkman, John Zarlengo (Also Air Medal). **TECHNICAL SERGEANT:** Chester F. Thew (Also Air Medal). **STAFF SERGEANT:** Raymond P. Legault (Also Air Medal). **SERGEANTS:** Alexander Bloshko, Lewis Coburn, Donald L. Kerns, Glenn D. Norton (Also Air Medal), Charles H. Spencer, Gordon Thorpe.

SOLDIER'S MEDAL

MAJORS: Frederick E. Crockett, Curtis W. Handley. **CAPTAIN:** Clarence H. Bomberger. **MASTER SERGEANT** Warren J. Morris. **FIRST SERGEANT** Guy G. Cope. **STAFF SERGEANTS:** Robert L. Beale, Louis C. Conner, Irvin M. Patterson. **SERGEANTS:** Harlos G. Ackerman, Hendrik Dolleman, Niels C. Jensen, Stockton W. Teague, Oran E. Toole. **CORPORALS:** Roy J. T. Harris, Donald Kent, Cecil V. Luke, Walter K. Riddle. **PRIVATES FIRST CLASS:** Ormund H. Munger, Jr., Joseph C. V. Pelletier, Salvatore Pillera, Joseph Profeta. **PRIVATES:** Benjamin W. Bay, Floyd A. Nelson, Frank M. Szunyogh, Godfrey E. Walker.

OAK LEAF CLUSTER TO SOLDIER'S MEDAL

LIEUTENANT COLONEL Bernt Balchen.

AIR MEDAL

GENERAL Henry H. Arnold. **COLONEL** Donald N. Yates. **LIEUTENANT COLONELS:** Milton W. Arnold, Henry V. Bastin, Jr., Robert L. Morrissey. **MAJORS:** Paul D. Brown, Harry J. Holt, David M. Jones, William P. Martin, Edward P. Myers*, Wiliam M. Redington, Charles B. Westover. **CAPTAINS:** Richard H. Beck, Donald Blakeslee, William T. Cherry, Jr., Thomas R. Cramer, Gerald J. Crosson, Charles W. Dean, Selden R. Edner, Donald L. Gilbert, Joseph R. Holzapple, Willis E. Jacobs (Also Oak Leaf Cluster to Silver Star), William E. Kinney, John W. Livingston, Edwin A. Loberg, Robert V. McHale, Ray Melikian, John C. Nissen, Richard C. Ragle, John M. Regan, Edward W. Robinson, John L. Ryan, Billy B. Southworth, Jr., Richard D. Stepp, Henry W. Terry, Thomas J. Watson, Jr., Fred E. Wright. **LIEUTENANTS:** Robert G. Abb, Raymond L. Adair, John C. Adams, Frederick T. Albanese, Carl L. Aubrey, Edward J. Bechtold, Clinton W. Benjamin, John G. Benner, Grover C. Bentinck*, Vernon A. Boehle, Rozert A. Booch, Guy C. Brantley, Sheldon S. Brinson, Richard C. Brown, Samuel M. Brunson, LeGrand W. Burt, John J. Charters, James A. Clark, Jr., Charles W. Cranmer, Howard M. Crow, Dean E. Delafield, Joseph Dockweiler, Joe E. Dodson, Scott S. Douglas, Robert U. Duggan, Robert D. Eames, William W. Elliott, Leo M. Eminger, Isaac L. Epperley, Jr., William F. Erwin, Roy W. Evans, George E. Ewald, Maurice Stephen Feltz, Gene B. Fetron (Also Oak Leaf Cluster to Air Medal),

(Continued on Page 38)

Air Forces ROLL

CONGRESSIONAL MEDAL OF HONOR

LIEUTENANT COLONEL: Pierpont M. Hamilton.

DISTINGUISHED SERVICE CROSS

MAJORS: William G. Benn, Algene E. Key, Allan J. Sewart, Jr.* **CORPORAL:** Ivan W. Henderson.

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* Posthumous.

Sgt. L. C. Rambo

Lt. Clarence Wilmarth

Lt. J. T. Jarman

Capt. W. T. Cherry

Capt. B. B. Southworth

Lt. J. J. Heard

Sgt. R. G. Ryan

Brig. Gen. F. Armstrong

Lt. R. S. Gustke

Major J. A. Rouse

Sgt. A. M. Bloshko

Lt. Col. J. S. Chennault

"IN CASE OF ACCIDENT"

(Continued from Page 19)

standing up against a 60-foot spruce tree. It didn't look much like a plane even if they could see it. They didn't either, till the eighteenth day, and by that time we had almost given up hope. We had taken off—I mean crawled off like hurt dogs—when they found the ship. But I'll come to that later.

Mostly we stayed in the wreck under heavy covers, the first six days. I hadn't been able to find the flare pistols but did locate some warning signals like railroad fuses. When a plane was coming over, I'd light one of these and hold it out the window. But the light wouldn't even shine above the trees. We found the same trouble later when we built fires outside—the smoke wouldn't go above the forest.

During the second week we'd build a fire whenever it was clear. Dry wood was hard to find near the crash and we'd burn crates from the plane. After a time we began to wonder whether they would find us. What did I think about? Mom and Dad back in Wisconsin—they were born in Poland, you know; my girl, Eleanor, whom I met in Hollywood during basic training; my kid brother, who's in basic training now. Then I'd wake up thinking about hamburgers, and malted milks after basketball games. Or Mom's doughnuts after my cousin, Kuba, and I would return from hiking. We'd go every Sunday when I was off work at the paper mill.

A funny thing happened once. At the mill I guess I handled tons of what we called blue batting. When Alexander's fingers froze I got out the first aid kit and unwrapped the gauze. I noticed the paper wrapping was made by the mill where I had worked.

Well, on the eleventh day we thought we'd better try to crawl to the airfield. Alexander, though, was afraid he couldn't keep up. He's older, you know, and he wanted me to go ahead alone. I didn't want to go off and leave him, but on the thirteenth day I started out, sort of on my hands and knees. I strapped my bad leg to the little toboggan-sled, which the planes carry, and put a ski on my right foot. I'd lift the sled forward with my left foot, then slide ahead on my right foot. Three times I fell down and it would take fifteen or twenty minutes to get up again. My broken leg would get tangled. About a quarter of a mile out I heard a plane testing its magnetos. The sound came from straight ahead so I thought I was on the right track. But when the plane took off it showed up to the rear, and I knew I'd been thrown off by echo. I'd been out three hours in the wrong direction. It was uphill all the way but I made it to the plane just after dark.

It was warm that day—maybe as high as 50 above. My clothes were wringing wet and Alexander made me undress. Next day, he said he'd try it with me. It was one p. m. before we got off. I took the sled, which we loaded with rations. We took four packages of dried noodle soup, seven squares of bouillon cubes and a three-inch length of summer sausage. We also took matches, a hunting knife, the .38 Colt, and extra parka for me and a leather flight jacket for Alexander.

I went ahead. I took the lead rope of the sled and tied it to my wrist. Then I fixed a strap to the rear of the sled and tied it to the same wrist. This way I could push the sled ahead with my arm as I crawled forward and yet keep the sled from getting away. I'd dig my elbows into the snow and pull forward. It worked.

Alexander used snow shoes on his hands. First day he put his arms through the foot fastenings up to his elbows, then rested his knees on the "heel" of the shoe. This was a mistake because he skinned his knees very badly. Next day he just grabbed hold of the bindings and used the shoes on his hands to pull himself forward.

We crawled this way for four days. The Canadian Mountie and U. S. Army lieutenant who found us the morning of the fifth day said we had made four miles. We knew we were close, for the night before we'd seen a plane overhead with his landing lights turned on.

That fifth morning of the crawl we had gone 100 feet. There was a shout: "Hello there." The Mountie came through the brush and I said: "Gee, am I ever glad to see you!"

That's about all. Mac, the Mountie (Constable N. S. MacWhirter and Lieutenant Felix Davis had run across the trail I made on my false start. They traced it to the plane, then picked up our new trail which was four days old. The Mountie went off for more help and Lieutenant Davis stayed with us. Soon a plane flew over and dropped a mailbag full of rations. We fought to stuff food into our mouths. Then the rescue party came—fourteen of them—with a toboggan and sled. They pulled us to the edge of a nearby lake, where a ski-plane waited. It flew us to the field and we were put in the base hospital. Next evening we left for a hospital in Edmonton. And, boy, did they treat us good!

The newspapers always tell about the notes you leave when things look black. Well, I left one, too. It said:

"In case of accident please send baggage to Mr. Stanley Wilczynski, Nekossa, Wis. Also have baggage at Curtis Hotel, Minneapolis."

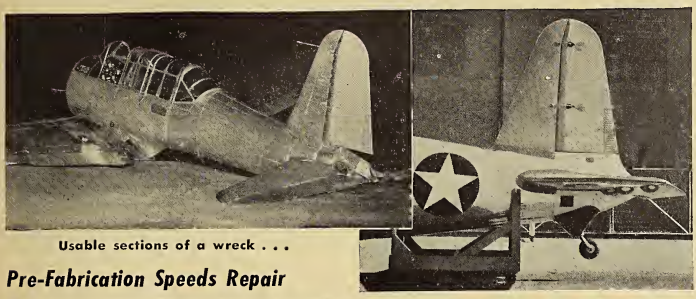
You know, I forgot to tell them where to send me! ☆

NOTES FROM ANTILLES

(Continued from Page 23)

If a red pennant with white fringe flies from this pole, it indicates that the family has a virgin daughter of marriageable age; the white signifying her chastity. A large red pennant without fringe but with a smaller white-trimmed red flag under it means that a girl in the house has borne a daughter out of wedlock. A large white pennant announces a boy in the family. A small white one under a large red one tells that a girl has borne a boy-child out of wedlock. An orange flag means that papa will trade a daughter or two for a son. A purplish pennant has been called "practically an SOS signal"—a notice that the old man will sell some of his daughters for cash.

THINGS YOU REMEMBER. The slow but reliable, hard-working, weatherbeaten B-18s used through the islands, particularly one called "Ye Ancient Ox Cartte" . . . The numerous hangars and engineering buildings made of palm fronds, native fibers, sheet tin, and anything else that comes to hand . . . A sign in an Air Transport Command base bar, announcing that it's the "Tuna Puna Tavern, Ltd. Main Office, Brooklyn, N. Y." Sandwiches in this tavern are offered as follows: "Hamboigers—15c; Ham—20c; Chizz—15c" . . . Young flyers, in bland disregard or ignorance of regulations, heading back to the States with monkeys, parrots, and koala bears from Down Under . . . The picturesque but unserviceable paper money—gook money—used in many of the British West Indies . . . G.I. truck drivers airily driving on the left in those same B.W.I.s as though they'd been born to it . . . A tennis court on one island made of bauxite, which is 50% aluminum. So plentiful is bauxite ore that natives use it as gravel to build roads . . . The varieties of rum drinks — rum-and-coke, rum-and-soda, daiquiris, frozen daiquiris, rum-swizzles, planters punches, and just plain rum—that are the vogue in the Caribbean . . . The familiar story that one island, plagued with snakes, imported mongeese to kill the snakes. Now there are no snakes but the people don't know how to get rid of the multiplying mongeese . . . A sight from an airplane in a sunny tropical rain—the shadow of the plane on a cloud below, encircled by a rainbow. Sometimes called the Pilot's Cross and supposed to be lucky . . . Businesslike transport planes on their way to Africa, loaded to capacity and then some . . . The many men who have been in the Antilles for two years or so, and who have missed a good many boats, eager to know how things are back home . . . And, above all, the morale of these same men. Doing a hard, vital yet unsung job, and doing it cheerfully. You hear as much spontaneous singing in the Antilles as anywhere in the Army Air Forces. ☆



Usable sections of a wreck . . .

. . . become prefabricated parts.

Pre-Fabrication Speeds Repair

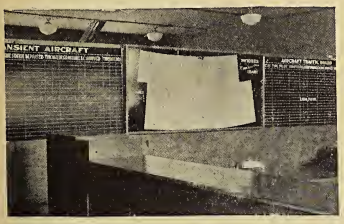
At Perrin Field, Texas, Major Douglas Soper and his civilian mechanics of the 98th Sub-Depot have developed what they believe to be a new method of quickening repair work on damaged aircraft. Briefly, this is an adaptation of the familiar production line technique—prefabrication.

Sub-assemblies are put together from airplane parts salvaged from previous crashes and repaired. These assemblies, completely rebuilt, are set up on cradles and held in readiness for further needs.

This method is said to be so successful that a Vultee basic trainer—the type of plane serviced by the Sub-Depot—was returned to the flying line only 28 hours after suffering major damage in a forced landing.

As shown in the photo above, taken just after the crash, only the fuselage was usable. Major Soper's crew hauled out their prefabricated assemblies, put the rebuilt plane together, gave it an hour's slow time on the engine, test-hopped it and returned it to service.

To the obvious objection that prefabrication ties up parts, Major Soper replies that when individual parts are needed they can be removed from the assemblies. Then, when damaged parts are repaired, they replace those taken from the assemblies.—**Perrin Field, Texas.**



Large Scale Weather Chart

A chart (above) showing contact, instrument or closed weather conditions at principal airports in a large area—thought to be the first of its kind in the Air Forces—has recently been installed in the Dispatcher's Section of the Post Operations Office at Merced Army Flying School, California, by Lt. Col. P. O. Brewer, Operations Officer.

The value of this "Weather Flying Condition Chart" to the pilot contemplating a cross country flight is apparent. He can determine conditions in advance for his entire trip and choose the proper route, according to the safety of conditions in certain localities.

The chart is made of black sheet iron. Four regional maps are pasted on it, and plastic letters are used to designate conditions—"X" for closed, painted red; "C" for contact, painted blue; "N" for instrument, painted black. On the under side of each letter is a small magnet which makes it stick to the chart. Changes in the hourly weather sequences, if any, are indicated on the chart as they are received from the Weather Officer. On this page is a photo of the chart as it appears in the Operations Office. —**Merced Army Flying School, California.**

Hollow-Steel Props

Erosion of propeller blades from dust, sand, mud, gravel and water thrown into the propeller disc by the nosewheel of airplanes has been practically eliminated through development of the hollow-steel propeller blade.

In addition to superior erosion resistance, the hollow-steel blade is lighter than large-diameter wood propellers and permits use of small compact hubs; its tortional rigidity is greater than any other type. Damaged blades can be repaired readily with a comparatively small amount of equipment. Service life of these blades is believed to be unlimited.

The United States, it is believed, is the only nation having hollow-steel propeller blades in production.

Four large factories have been in quantity production for some time on three different types of hollow-steel blades—all developed by Army Air Forces funds. A fifth factory is ready for production of a new type of flash-welded construction, invented and developed under the supervision of Materiel Center, Propeller Laboratory engineers.—**Wright Field, Ohio.**

98th Invention

Earl C. Gregg, 44-year-old senior machinist in the sub-depot of the Enid Army Flying School, Oklahoma, has to his credit 98 time- and labor-saving devices—last of which is a new type airplane wheel chock which operates mechanically. Made of bar steel, it has a steel apron which becomes an anchor to prevent the aircraft's wheel from sliding either to the front or to the back while the engine is being warmed. This chock will soon replace the old wooden block at Enid.

Automatic wheel chock.

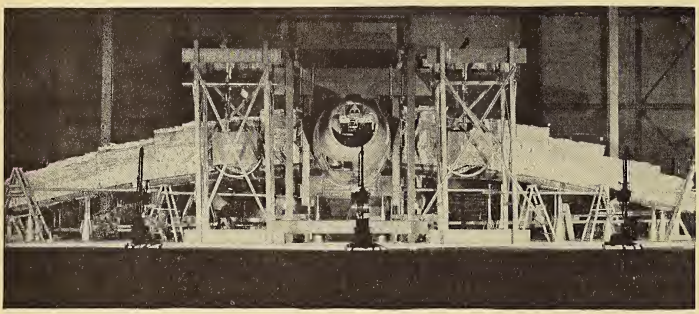
Gregg (above), whose walking has been impaired since he was six years old, was formerly operator of a machine shop in Enid. Three of the inventions he has submitted to the government are reported to be now in the experimental stage. One is a new type bomb, another is a motorless torpedo, and the third is a magnetic ship lock. —**Enid Army Flying School, Oklahoma.**

New Rescue Aid

A new rescue aid of the Army Air Forces now being packed in all life raft emergency kits, is a yellow-green fluorescein dye that can be seen for many miles when spread on the water.

Packed in metal cans and paper envelopes, the dye can rapidly be scattered on the surface to attract the attention of friendly aircraft.

This dye also is used in Mae West (B-4) Life Vests. It is enclosed in a small packet that is cemented between the inflatable envelopes of the vest. Upon contact with the water the packet and dye dissolve, coloring the water for a large area around the survivor.—**Wright Field, Ohio.**



Static Test on B-26c

More than sixty tons were stacked on the wings of this B-26c bomber (above) while undergoing tests in the Static Test Building of the Aircraft Laboratory, Engineering Division, Wright Field.

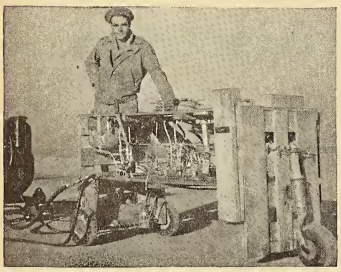
When the picture was taken, the wing load was 25 per cent more than the maximum load for which the wing was designed. Maximum load under Materiel Center specifications includes a suitable margin of safety to protect plane and pilot in maneuvering and in unusual emergency conditions.

The test was conducted from a positive low angle of attack condition to determine maximum overload possible on this type of plane. The test was one followed to destruction and is typical of tests conducted by the Aircraft Laboratory on plane components.—**Wright Field, Ohio.**

Mobile Test Bench

Men of the 28th Air Depot Group at Stinson Field, Texas, have developed a mechanical monstrosity known as the "Hydraulic Jeep" (below), which is proving useful as a trouble shooter.

Whipped together from spare parts lying about the hangars, this contraption is a mobile test bench which can be moved right out onto the flying field and hooked up to the hydraulic system of any airplane. It will locate the trouble instantly, thus obviating the necessity of taxiing the plane to a hangar.



The front wheel of this gadget is really an old tail wheel from a discarded airplane. It is not only connected with the steering gear but is retractable, permitting the bench to lower itself to the ground for stability. The "rear wheel construction" is made of a fabric material coarse enough to provide excellent traction on any field's surface.

The enlisted men who designed and built this device are Privates August Canney, Paul Kahn, William D. Cooney, Sam Durfee, Herbert Doershuk, Bernard Lawrence, and Bob Hirschback. All are under the command of Captain Fred A. Deyo, Engineering Officer, who has previously contributed to Army Air Forces inventions by perfecting a bomb-loading device now in general use.—**Stinson Field, Texas.**

Heated Surface De-Icing

Although not new in principle, heated surface de-icing systems have been satisfactorily installed on most types of Army Air Forces planes. Advantages of the new de-icing system are simplicity of control, as compared with the rubber boot de-icer commonly used, and the conservation of large amounts of critical rubber.

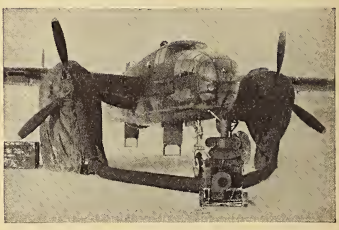
The heated surface system conducts exhaust gas through an air exchanger. Cold air, which is picked up by a ram usually located behind and within the radius of the airplane propeller, is passed across or through the heated air exchanger. It is then carried in ducts along the leading edges of the wings and empennages. The air, after losing its heat, drifts toward the trailing edge of the air foil where it is exhausted.

The system can be operated continuously during flights in which the formation of ice is considered possible, thereby relieving pilots of the necessity of looking carefully for ice formation on airfoil surfaces, as they must do with rubber boot-type de-icers.—**Wright Field, Ohio.**

Preheating Saves Time and Engines in Arctic

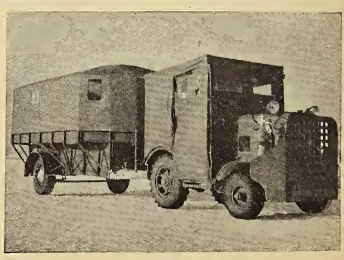
Army Air Forces fighting ships based at Alaskan airfields are now being preheated by gasoline-fed heaters. Motor-driven fans blow hot air through pipes to the vitals of the engines, and the heat is confined to the points at which it is needed. Engines are brought to the proper flying temperature in from 15 minutes to an hour, depending on the degree of the outside cold. In temperatures frequently far below freezing, this method saves time as well as wear and tear on parts. In extreme cold, engines can not be turned over until properly "cooked."

Below is a B-25 North American Mitchell bomber being prepared for service, its engines swathed in padded canvas hoods.



New Model "Cars" at Dow Field

1 . . . Eighteen mechanics, complete with working equipment, can be transported to jobs around Dow Field, Maine, on the time-saving vehicle (below) designed by men of the 332nd Sub-depot. A canvas covered trailer is towed by a conventional Clark tug. Over-all length of the trailer is approximately 24 feet. The canvas is supported by horseshoe-shaped ribs, both of which can be removed in summer so that a larger load can be accommodated.



2 . . . Lt. George Van Laethem (above), of the 332nd Sub-depot, Dow Field, rides a scooter rigged with a "windbreaker" to take the edge off Maine's winter winds. The windbreaker, used on auto-gliders or scooters, is of simple construction, incorporating a framework of half-inch round stock in two rigid sections, the lower half being covered with canvas, the upper half having a light grade of plexiglas sewn into a canvas border for proper driving vision.

Capt. F. M. Lyle operates before the camera.

Surgery Movies for Instruction

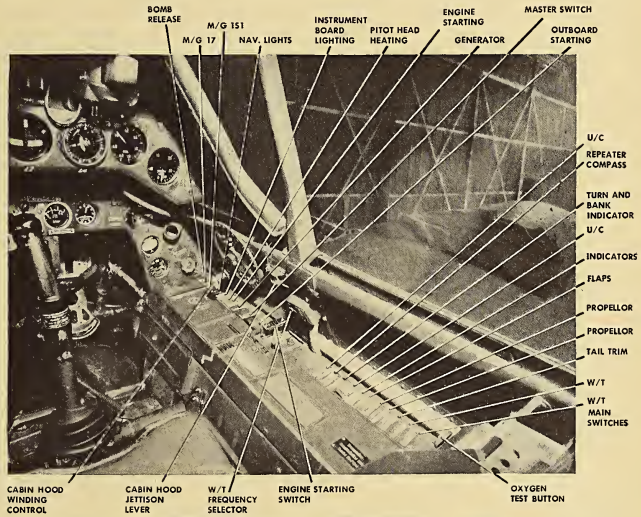
Captain Francis M. Lyle, of the Base Hospital at Wendover Field, Utah, has instituted a policy of filming important surgical operations performed at the hospital. Education and training of enlisted men students will be greatly facilitated through use of these films, for they show pictorially details which otherwise might require hours of oral description.

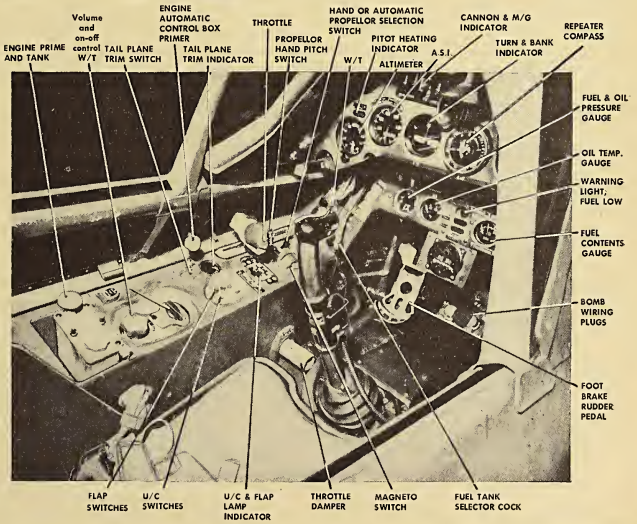
First operation to be filmed at Wendover (above) was an operation on Corporal William Woznak of the Repair Squadron. While carrying an anvil, Corporal Woznak suffered a torn cruciate ligament and a mesial semi-lunar cartilage. A 45-minute operation was photographed from beginning to sewing of the last stitch by Corporal Norman M. Germond.

While first films have been black-and white, Captain Lyle intends to try color film shortly. This, he says, "should add immeasurably to the clarity of the record."—**Wendover Field, Utah.**

Closeup of the Focke-Wulf 190 Cockpit

The capture of enemy aircraft in salvageable—sometimes flyable—condition has proved an invaluable aid to our engineers in determining designs and adjustments in our own aircraft which will make them superior to those of our adversaries. The photos below show the cockpit of the FW-190, with the various instruments labeled in English. Pilots of this German fighter have fewer instruments to work with than pilots of the average American fighter plane.





Look Proud Mister—

You're at O.C.S.!

By Lieut. William L. Richman

HARLINGEN GUNNERY SCHOOL, TEXAS

WHERE is the Coral Sea? . . . What's the difference between a Springfield and an M-1? . . . What makes you think you'll make a good officer? . . . How high is up?

It didn't make a bit of difference to the Board of Officers seated around a large table who you were, where you came from or what you did in private life, or how much money you had.

I was lucky. I knew the right answers—at least some of them. I decided before I walked into that room that I wasn't going to try to outsmart them. I made up my mind, scared as I was, that if I didn't know the answers I'd say so. Hell, I hadn't cracked a newspaper or listened to the radio once during the ninety days of basic it took me to learn how to tear apart the bolt of a Springfield rifle; how to adjust and remove a gas mask in 20 seconds; the I.D.R. and its various complications; a complete course in K.P.; "How to G.I. a latrine", and a million other things a soldier needs to know.

There wasn't an easy moment learning how to be a soldier. And strange as it may seem I enjoyed every minute of it. My delicate stomach disappeared. I no longer had any need for or used the saline preparations my wife tossed into my bag when I walked off to join the Army of the United States.

I left our little farm house, sixty miles north of New York City, early the morning of June 2nd, 1942, after kissing my wife and 11-months old baby goodbye. This war wasn't going to be a glamourous adventure for me—wings and all. I knew it meant hard work. And after sitting in a law office for more than fifteen years, I was frightened at the prospects of hard work. But I had to go and my wife knew how I felt.

Who is the Commander of the British Army in Africa? . . . Where are the Solomon Islands? . . . How come you left a wife and baby to join the Air Corps? . . . How long have you practiced law? . . . So you were in the Connecticut National Guard? . . . How many hours can a soldier fight aggressively with a gas mask on?

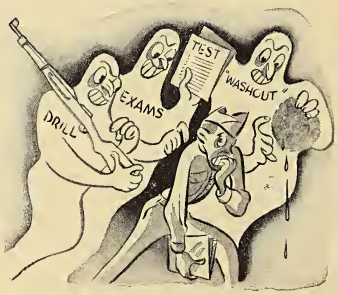
When I boarded that train to the accompaniment of the Post Band, I was with a bunch of kids 15 years my junior. We had taken the oath of allegiance and been put through the induction wringer in New York. Now we were on our way, and we didn't know where we were going. My heart pounded and my knees shook. I thought I was thrilled. Maybe I was scared.

WHEN would I see my family again—if ever? Who's responsible for these goddamned wars? Isn't it possible that after this thing is over we'll be able to move into the driver's seat—and hold the reins?

Thirty-three hours later we stretched tired legs on the platform at Miami, Florida. The town looked good again. I was glad to get back. It would be nice, I thought, to renew old friendships made on previous pleasure trips. Maybe I'd play a little pinochle. If you can't play pinochle, don't get assigned to Miami.

It was beastly hot. I sweated like a pig. They gave me salt tablets. They marched me to the golf course that I knew so well. I didn't play golf. I marched in squares—and wound up in circles. Five long hot hours each day. We stood in lines two blocks long for a gulp of warm water during the ten-minute breaks each hour. I developed the most beautiful set of blisters ever seen in the United States Army. And when it rained! Well, we just plowed through water up to our knees, soaking wet, steaming hot.

ILLUSTRATED BY
LIEUT. WILLIAM B. LENT,
O.C.S., Miami Beach, Class 43-B



I pulled K.P. on my birthday. The boys gave me a little party just before the dinner rush, presenting me with an officer's belt and a carton of cigarettes. After that they sent me to the kitchen and I washed and rinsed food trays until eight that night. We marched back singing—my voice the loudest in the formation. I washed windows—millions of them. I "G.I'd" the beautiful hotel floors until the skin wore off my hands. I lost that excess fat quickly. They waste no time at Miami Beach. For the first time in seventeen years I felt as I had when a buck private in the Connecticut 102nd Regiment, Inf.

The Army succeeded where private masseurs had failed. I was slowly getting conditioned without knowing it. I was eating twice as much food as I had at home, and enjoying it. It was good to regain the feel of a gun again and I knew deep down in my heart that I was once again a soldier. I shed twenty pounds; my waistline slid from 37 to 30 inches. My corns disappeared and my G.I. shoes embraced my feet with loving care. I learned how to be a soldier at Miami Beach. My next job was to learn how to be an officer.

The Board accepted my frank statement when I said that I would become a good officer. I convinced them I was honest when I declared that I was satisfied that I had become a good soldier.

On September 18th, 1942, they made me a corporal. On the same day we marched from our headquarters up to O.C.S. Ten short blocks. God, we were happy and proud! We were accepted by the board—and that was really something. We had heard weird and fantastic tales about O.C.S. Miami Beach. But we were good soldiers—tested and found qualified.

"Processing" they call it. But we sweated it out. And what an experience!

"Sound off, Mister!"

"Let's see your shoulder blades touch!"

"Throw your chest out!"

"Suck your gut in!"

A graduate of Air Forces school at Miami Beach looks back over his "pop-to" days.

"Reach for the ground!"

"How old are you?"

"37? Good, let's see 37 wrinkles in your chin!"

You draw your chin back until you see black spots before your eyes and you gasp for air. To another chap: "So you were a first sergeant, eh? Well, listen, Mister, stripes don't mean a thing around here. Get them off!"

"From now on you're Officer Candidate Jones!"

"Look proud!"

"Don't you like it here, Mister?"

Indignation raged in my breast. I wondered if all this was worth it. I was about to say the hell with it when a brand new second looie, finding out I'd enlisted, leaving a wife and kid back home, whispered in my ear: "You're a good man, soldier, you have more of a right being here than I had".

That remark cheered me up. I really "popped to". It didn't matter that my chest was on fire and my back was breaking. I began to realize that there was a purpose behind all this "nonsense". They wanted to see whether or not "you could take it". They didn't propose wasting their time or the government's money training officers who might, at some later date, quit when the going got tough.

I got a big kick when Officer Candidate Clark Gable, Class 42-E, "braced" me. Make no mistake about that man. He may have been the great lover on the screen. At O.C.S. Miami Beach, he was every inch a soldier.

Mess Management (with the gnawing fear that you might wind up a mess officer); Supply; Administration; Military Law; Identification of Aircraft; Structure, Terminology and Theory of Flight and three dozen other subjects were thrown at you until you were dizzy. "Fizz-ed" with its obstacle course which left your muscles aching and your lungs pounding against your ribs; burpees; side-straddle hope; arm, shoulder and leg exercises. They really gave you a work-out, make no mistake about that.

Time passes unbelievably fast. Before you know it your fourth-week marks are posted and you find out for the first time where you stand. You either ease up a bit or tighten up. You can't and don't relax. The day just isn't long enough. Ten minutes to fall out for reveille at five in the morning—and they don't mean eleven minutes. More than likely Colonel McNair or Colonel Nelson or Major Lewis or our "house-mother", Lieutenant Jack Sullivan, might be observing the formation from the shadows.

And how they could make soldiers! I remember vividly how big Sully, a graduate Air Mechanic, with five days drill under his belt, arrived at O.C.S. Miami Beach and wound up a Group Commander in the Corps. It was a pleasure to watch his march. Nothing finer ever came out of West Point.

I plowed along. My "furrows" remained even. I did everything asked of me. I stood rigidly at attention for 45 minutes or so at

every retreat formation, never taking my eyes off the neck of the officer candidate standing equally as rigid in front of me. I often became oblivious of my surroundings. My mind would wander off. I'd try to think of my wife and baby. I wondered whether or not my mother was feeling any better. I wondered if I'd ever get to Australia or Africa or Europe.

I'd glance out of the corner of my eye and see kids "passing out." At O.C.S. the only way a candidate can leave a retreat formation is to be carried out. When Major Lewis heard that some of the squadrons were using spirits of ammonia to keep the boys from "peeling off," he hit the roof.

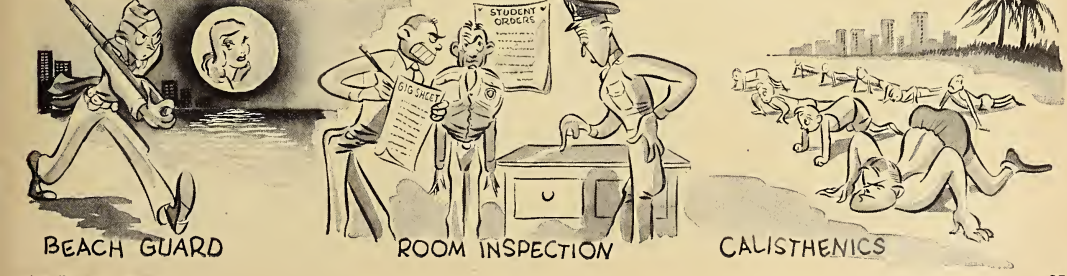
Before I knew it I became an upper-classman. I put shoulder straps on my khaki's and had the "hours till graduation" counted off for me by the under-classmen. I glanced at the eighth-week marks apprehensively. I was curious to know whether or not I slid a few hundred places or was holding my own. I started to figure out my chances of escaping the "washboard."

At that point you know whether or not you can ease up just a bit or really start worrying. And the powers-that-be cooperate beautifully. They let you go out and order your uniforms, and the stimulant is exhilarating, but you've just got to make the grade. That swell-looking uniform you tried on is waiting for you. You don't dare get careless. You are cautioned, cajoled and beseeched by your Tack Officer not to let down. You go into the home stretch with dreams of covering yourself with glory in some theater of operations. By this time the metamorphosis has set in. You're suffering from "delusions of grandeur."

THE classification department tries to find out where you're best suited and fit you into the job you'll like. You knock your brains out trying to convince them that you're just right for combat intelligence. You're turned down. Too old or too many dependents or something. You hear that they're accepting applicants for aerial observers. Once again you forsake your dinner, dash up there, file an application and once again you're turned down. So what? So you start wondering.

For a while you feel sorry for the boys who "washed out." The orders of the day like to refer to these unfortunates who couldn't quite make the grade as "eliminees." The word sounds less harsh; the pain and disappointment remains. You move about feverishly to clean up odds and ends. By this time your marching pleases the West Pointers who run the school.

"Unfortunately," I missed the "dry run" the day before graduation. There was a little matter of walking a two-hour punishment tour that had to be disposed of—and my luck held out to the end. I squared accounts between 1500 and 1700 o'clock Tuesday, December 8th, 1942. The "dry run" was scheduled for 1700 o'clock the same day. The squadron marched off at 1645 o'clock. I got back to my billet at 1705 and at 1715 the heavens broke loose and for the next two hours, while my room-mates were rehearsing a "dry run" in a torrential downpour, I was reposing peacefully—stretched out on the carpeted floor—sound asleep.



Yes, my luck held out to the end. That night we were honorably discharged from the Army of the United States. Despite the fact that we were civilians once more the authorities thought it might be a good idea if we remained their guests for the night. They confined us. Their reasoning was very sound. Lots of the "civilians," including myself, were just about ripe for a real "package." We didn't get a chance that night.

The next morning the underclass took over and marched up to the parade grounds. The stands were filled with proud wives and relatives. The entire corps passed in review —36 squadrons of upper-classmen about to be commissioned en masse, and their underclassmen, equally happy to move up into our places and dreaming of their brief moment in the sun six weeks hence. We were told afterwards that we marched like West Pointers. A greater compliment could not have been given us.

After the review, the under-classmen marched away to their own duties and problems. We were put at ease. Speeches were made, medals presented, and for the first time in 12 weeks we relaxed. We were strong and tanned and healthy. The strain and pressure left us, and with it disappeared the fatigue of 12 long arduous weeks.

A few minutes later we became Second Lieutenants (Temp) in the Army of the United States.

My wife persisted in clinging to my arm as we slowly strolled back toward by quarters. She shared in my happiness and I was happy for her. She was not only a Lieutenant's wife, she was a soldier's wife! All around us brand new Lieutenants were feeling proud and strong. Some had already blossomed out with their bars and insignia. Their exuberance knew no bounds.

Just as I was about to enter my hotel, we bumped into a sweet kid from New Hampshire who had worked with me when we were both privates. He had qualified as an Aviation Cadet and was awaiting appointment. He tossed me a snappy "highball." I told him I knew of no finer person to earn that dollar for the time-honored and traditional first salute. He asked me to autograph that dollar bill and said that he would cherish it as a good luck omen when his turn came to "soar into the Blue."

My orders directed me to report to the Commanding General of the Gulf Coast Army Air Force Training Center. From there I was fortunate in being sent down to the Harlingen Army Gunnery School at Harlingen, Texas.

Every Saturday afternoon I watch these youngsters, their new silver gunner's wings glistening in the Texas sun, march off to the railroad siding to keep their rendezvous. I go back to my desk, heave a sigh and continue to initial W.D. Q.M.C. Forms #33.

Despite the fact that I'm a victim of "delusions of youth," I live for that day when I'm ordered to foreign duty. I hope that day comes real soon. I'm getting restless as hell. ☆

ROLL OF HONOR

(Continued from Page 31)

Philip S. Fischer, Luther G. Fisher, Charles Folk, Andrew J. Friedrich, David L. Gaede, Russell J. Gardiner, Edward H. Gibbs, John L. Graw, Charles L. Grimes*, Edward S. Hadfield, Gilbert O. Halsey, Robert D. Havens, Joseph E. Hensler, Ray M. Hilliard, Jacob Hochman, Kenneth W. Howat, Theodore A. Janowski, Robert S. Jenkins, Clarence T. Johnson, Jr., Richard O. Johnson, Francois J. Judkins, Howard A. Kelly, Joseph H. King, Raymond N. Kurtz (Also Oak Leaf Cluster to Air Medal), Paul J. Kyle, Lucius G. LaCroix, Donald H. Lee, Jr., Burt Le Grand, Herman W. Lewis, Yale H. Lewis, Vernon H. Linder, Richard D. McMinn, George M. Manning, Dan D. Margworth, William B. Martensen, Richard W. Meldon, William E. Mikolasy, Fred Z. Milam, Ernest Miller (Also Oak Leaf Cluster to Air Medal), Richard E. Miller, Stanley M. Millick, Wendello Myers, Nathan Newman, John D. Nicks, Robert J. Nolan, Joseph M. Oblinski, Frederick C. O'Riley, Jr., Lawrence R. Ott (Also Oak Leak Cluster to Air Medal), Cadman V. Padget, Robert J. Paulsen, Carol W. Payne (Also Oak Leaf Cluster to Air Medal), Jan Pepe, Eugene J. Pollock (Also Oak Leaf Cluster to Air Medal), Victor H. Prendinger, Dean J. Raaz, Raymond M. Rahner, Glen Murray Rynerson, Kenneth Nick Saxhaug, Gene B. Setrow, Robert E. Smith, Frank Solinsky, Reynold A. Soukop, Robert D. Spitzer, George M. Staples, Edward H. Steere, Jr., Carl R. Storrie, Martin W. Strauss, Harvey S. Tamon, William M. Tharpe, Albert N. Thom, Omar D. Thomas, Thomas H. Trent, James F. Van Ausdal, Walter C. Vitumac, Oliver B. Vodrey, John W. Wallace, Jr., Russell K. Weller, Robert H. Willis, Milton E. Wills, Jr., Barnett C. Wilson, Paul F. A. Wilson, Frank H. Woltman, Ashley C. Woolridge, Joseph A. Worthington. **WARRANT OFFICER** Donald D. Greenawalt. **MASTER SERGEANTS:** Aaron R. Adams, Edward Schrempf, John J. Zuba. **TECHNICAL SERGEANTS:** Marvin W. Cox, Harry Goldstein (Also Oak Leak Cluster to Air Medal), Joseph M. Herbert, Michael Kruge, James Moore, Clyde W. Nowlin, Vinson L. Phillips, Albert K. Santowski, Charles C. Schierholz. **STAFF SERGEANTS:** Wayne F. Austin, Gail L. Bahr, George Bryan Boyte, Robert Chopping*, Fred S. Croyle, John D. Friess, Anthony Gaeta, Edward Gosk, Henry G. Hayes, Albert E. Hill, Charles D. Hill, Jr., Gerald H. Hooten, Charles F. Kindle, Robert S. Krijak, Stephen G. Krucher, Earle P. Lemoine, Allen Middleton, Stanley J. Milik, Peter F. Novak, Donald T. Ostlund, Matt Schu, Robert W. Senteney, Edwin G. Smith, Charles H. Snyder, Vance H. Spears, Joseph M. Spire, William J. Standish, Charles R. Tipton, Henry J. Walloch. **SERGEANTS:** James M. Abbott, Tom J. Alder, Chester M. Allen, Willett T. Allen, Arlee F. Aten, Donald C. Bargdill, Franklin E. Beattie, William A. Beckham, Theodore L. Billen, Floyd R. Blair, George W. Bowers, Jr., Edward A. Bradford, Emory O. Brown, Max W. Burns, James H. Cox, Bernard C. Creswick, Clifford H. Cruse, Melvin H. Devoaa, Melvin H. De Voss, Robert C. Dewey, James V. Dixon, James S. Doherty, Paul L. Duke, Albert J. Durham, Lloyd A. Ellefson, Jerome A. Even, Virgil D. Faust, Richard K. Ferrill, Clavoe U. Fry, Henry H. Garner, Everett W. Gustafson, Rollin B. Heffernan, Leonard L. Hendry, Raymond L. Herwig, Elvin D. Hilger, Chester A. Hillman, Ralph M. Hoke, Lawrence L. Holgate, Edward C. Hudson, Jeptha F. Hughes, Russell L. Hultgren, Carl E. Jennings, Hugh A. Jones, Jr., William R. Kerins, Peter A. Kucharski, Robert C. Long, Frank X. Lutie, Thomas D. McMahon, James R. Mathewson, Raphael F. Penzenik, Glidewell L. Pollard, John N. Powers, Leslie C. Rambo, Richard G. Ryan, Donald R. Royer, Samuel J. Salvo, Edward L. Savoy, Raymond N. Schmit, Oscar E. Seddon, Andrew M. Seed, Kendall Shoop, Jack D. Smith, James C. Stephens, Jr., Albert St. Jean, Jack H. Stull, Abraham Todras, William J. Tomko, Wallace A. Walke, Charles U. Ward, Norman H. Watson, Joseph W. White, Willis A. White, Jr., William H. Williams. **CORPORALS:** Millard M. Akin, Raymond H. Alsip, Forrest W. Averbeck, Frederick J. Ballard, Jennings G. Beckwith, Russell F. Boudria, Sanford Caviness, Norva C. Chapel, Robert L. Fitzpatrick, Leonard K. Florence, Wayne Garey, George R. Graham, John Gregal, William C. Gregory, Lloyd W. Grieve, Edward W. Holland, Louis F. Houston, John A. MacDonald, Farrell W. Middell (Also Oak Leaf Cluster to Air Medal), Bruce W. Osborne, M. E. Roberts, Robert K. Rollins, Ernest L. Sweigart, Charles W. Ward, Gaines W. White, Paul R. Williams. **PRIVATES FIRST CLASS:** Clifford O. Boatman, Joseph D. Caldara, Edward A. Carroll, Robert D. Chapman, Darwin A. Garrett. **PRIVATES:** Charles F. Casner, Aldo P. Ramella, Anton H. Schmidt.

OAK LEAF CLUSTER
To Air Medal

MAJOR John W. Weltman. **CAPTAINS:** Leo G. Clarke, Jr., Joel A. Owens, Jr., Theodore H. Runyon.

THE LEGION OF MERIT
(In the Degree of Officer)

CAPTAINS: William E. Dyess, Joseph H. Moore. **MASTER SERGEANT** Edwin A. Logston.

CITATION
11TH BOMBARDIER GROUP
(As announced by War Department)

"The 11th Bombardment Group (H), United States Army Air Forces in the South Pacific, is cited for outstanding performance of duty in action during the period July 31 to November 30, 1942. Opposing the full force of the numerically superior Japanese with all available aircraft, the 11th Bombardment Group participated continually in attacking the enemy in his efforts to obtain a stronger foothold on strategic territories. Heavy damage was inflicted on Japanese airfields, storage and supply areas, seaplane bases, docks, troop positions and other installations. In addition, the action by this group resulted in the sinking of four enemy ships, the damaging of fifteen and the probable damaging of nine others. Throughout its operations, the group was faced with extremely difficult problems of logistics, airdrome improvement, and the necessity for long, hazardous overwater flights to reach enemy objectives which frequently were located at extreme flying range of its bombardment airplanes. The superior courage and devotion to duty shown by combat crews and ground units of this bombardment group is in the highest traditions of the United States Army and will always be worthy of emulation."

This award entitles the group to have a streamer for its colors and flag as well as a silver band for its guidon. After an organization is cited twice, its members wear a decoration of a blue ribbon in a gold-colored metal frame of laurel leaves.

This is worn by officers and enlisted men if they were members in either or both actions for which the organization is cited. Members with the organization who were not attached during either occasion of citation may wear the decoration only so long as they are a member of the organization.

PICTURE CREDITS

Front cover: AIR FORCE. 4-5: Mitchel Field, N. Y. 8: Rudy Arnold, Glenn L. Martin Co. 12-13: Lockheed Aircraft Corp. 26: A.S.C., Patterson Field, Ohio. 33-34-35: MAFS, Merced, Cal.; Wendover Field, Utah; Stinson Field, Texas. Back cover: AIR FORCE. All other photographs secured through official Army Air Forces sources.

CORRECTIONS

In AIR FORCE for March, 1943, the Foster Field, (Tex.), skeet tower pictured on Page 35 was incorrectly located at Jackson Field, (Miss.), and in the AIR FORCE Quiz answers on Page 40, same issue, the Messerschmitt 110 was identified as a two-seat fighter. Actually, the plane accommodates three, but in combat the crew is usually limited to two.

How to Keep Well in the BURMA THEATER

Brigadier General David N. W. Grant
THE AIR SURGEON

The following is the fifth of a series on health conditions in the various theaters of operation—THE EDITOR)

BURMA is an interesting country and a most beautiful one, but under the surface of handsome pagodas, lofty mountains, dense jungles and deep rivers lies one of the most concentrated collections of hazards to the health of man that exists on this earth's surface.

One can enumerate on the fingers of the two hands the communicable diseases that have *not* been reported from this area. The recognition of disease and other dangers will be of great importance to American troops operating in Burma. However, modern military medicine, especially military hygiene and sanitation, as now taught in the Army, has been developed for the sole purpose of keeping men well and fighting in just this kind of a country.

Prior to the Japanese invasion of Burma, the British had established European communities in the larger cities. But practically all of the facilities of these European communities are said to have been destroyed either at the time of the Japanese occupation or, subsequently, by allied bombings. The native quarters of the towns and the rural districts have been little affected by the white man, and the people exist in much the same state of culture as they did 200 years ago.

In other words, the American will find none of the modern sanitary devices that he is accustomed to at home, especially such things as municipal water works that produce pure water, or sewage disposal plants. He will have to rely upon the fundamentals of military hygiene and sanitation to protect him from disease. It will be necessary for each individual to appreciation the necessity for maintaining the same strict sanitary precautions that are enforced in the environs of all military installations, and to apply them wherever he may be.

Malaria is the greatest single cause of death among the Burmese. It occurs throughout Burma even at heights of 4,000 feet or more in the mountainous districts. It is the most important disease in the whole area, and in many districts 100 percent of the people are infected. Because troops suffering from malaria cannot operate efficiently, every precaution should be taken to avoid the disease.

Each man should have a thorough knowledge of the various methods of protecting himself from mosquitoes, not only from the malaria carrying type, but also from others. Dengue and filariasis (mosquito borne diseases) occur in Burma, but are carried by different types of mosquitoes. He should know the value of the mosquito net, how to use it, and care for it. He should consider it an essential piece of his equipment and should keep it available at all times.

The malaria mosquito usually bites at night. However, it may be encountered during the day time in dense jungle or shaded mountain valleys; therefore, when it is necessary to go out of doors at night, or to operate in a mosquito-infested region, long sleeved shirts buttoned to the neck, long trousers tucked into boots, and head nets and gloves should be worn. It is best to stay under a mosquito net as much as possible after dark if there are no properly screened buildings at hand.

AVAILABLE insect repellents are of little value for more than a few minutes, especially if the individual is sweating, so too much reliance can not be placed upon them. Because so many natives are infected with malaria, and can act as reservoirs of the disease, and because mosquitoes capable of carrying malaria are usually found in the vicinity of human habitation, it is best to avoid towns and villages, especially at night.

In many parts of Burma the Medical officer will recommend that the suppressive or prophylactic treatment of malaria with either quinine or atabrine be used. This method of treatment does not prevent malaria in the true sense and thus can not take the place of the previously mentioned precautions. However, it does suppress the symptoms of malaria and thus allows a man to carry on until the military tactical situation permits hospitalization. When suppressive quinine or atrabine treatment is once instituted, directions must be followed explicity; otherwise it may do more harm than good.

As mentioned previously, the people have little knowledge of, and even more important, little regard for modern sanitation. They carelessly deposit garbage and human waste in the streets, in the fields and along the banks of streams, and, as a consequence, Burmese towns have a distinctive odor and characteristic sight. Buildings not only serve as dwelling places for the family, but also for pets and domestic animals. Many houses have granaries for the family rice supply, which usually attracts rats and other rodents.

Because the rate of exchange is favorable, and because wages are so low in this part of the world, Americans frequently hire native boys to cook, run their errands, do the laundry, and perform other menial tasks. These boys may appear clean and may be intelligent. However, do not trust their knowledge of sanitation and hygiene, for their customs will be the same as their forefathers. Personally supervise everything they do until you have thoroughly trained them. Be sure that the medical officers say that they are not infected with a communicable disease. Be sure that they know enough to wash their hands with soap and water whenever they are soiled. Be sure they prepare your food exactly as Army doctors prescribe. And above all, be sure that the supplies that they purchase for you are safe.

There is an adequate amount of water in most parts of Burma. However, it can never be considered safe for drinking until treated. Dysentery, typhoid fever and cholera are common diseases in Burma, where they are usually water-borne. Because of the presence of these deadly diseases, only water

that has been treated by appropriate Army personnel should be used.

Since such water may not be available at times, every soldier operating in this area should know one or more methods of purifying water (FM 21-10). If he has no chlorine or iodine he should always remember that boiling water is one of the easiest and surest methods of purifying it. Under battle conditions it may be impossible to spend very much time purifying water. And since the wet, humid climate of Burma will cause copious sweating on the part of an active man, each soldier should have a thorough knowledge of the conservation of water. Men have lived on a quart of water a day for many weeks even when that quart had to be used for all purposes, but, in order to get the full benefit of such a small amount of water it will be necessary to form certain habits.

It is well to become accustomed to drinking small amounts of water slowly, or moistening the mouth and throat frequently with sips of water, and to drinking only at set intervals. Smoking and chewing tobacco increase thirst, while chewing gum or sucking on small pebbles stimulates salivation and thereby decreases thirst. It is essential for the body to have a certain amount of salt, but when one perspires profusely much is lost in the sweat. Unless this salt is replaced by taking salt tablets or by adding additional salt to the food, heat cramps and possibly heat exhaustion will result.

Even though flies and other insects exist in great numbers, there are few screened buildings in Burma. Foods in markets and kitchens are not protected, so it is easy for flies to move about at will from the manure pile to the food of man. Every precaution should be taken to combat flies. Flies that have been in contact with the wastes of persons suffering from the intestinal diseases (typhoid fever, dysentery and cholera) can carry these diseases to man.

Native fruits and vegetables are dangerous, for they are commonly raised in soil that has been fertilized with human waste, or washed in polluted streams. The safest rule is to eat only thoroughly cooked foods. Soaking fruits or vegetables in potassium permanganate solution is not satisfactory unless they have been soaked for a minimum of four or five hours. Thick skinned fruits should be peeled only by oneself and even then it is best to dip them in boiling water for a few minutes before peeling. There are very few dairy products in this area, and those that do exist are not safe to eat.

One should form the habit of never walking about barefoot. Fungus diseases, such as athlete's foot and dhobie itch are very prevalent in this area. They are not usually fatal but can cause sufficient trouble to cripple a man and thereby make him a liability to a fighting team. These diseases are easy to prevent if care is taken to bathe frequently. Dry all parts of the body thoroughly with your own towel, not with a towel that has been used by someone else. Be especially careful to dry between the toes, in the groin and under the arms. Dusting the body with powder, such as Army issue foot powder, and changing to dry clothing as often as possible are additional methods of preventing these diseases.

Fungus diseases easily can be transmitted from one individual to another, when the clothing of a man suffering from a fungus infection is washed with the clothing of others. It is therefore best to do one's own laundry or to always boil the clothing. Hook worm is another disease prevalent in Burma that can be picked up by walking about barefoot. A pair of bath slippers made of wood and some string is a great help in preventing both of these diseases.

The jungle country of Burma is inhabited by many obnoxious insects and pests, some of which are disease carriers, but the majority are purely troublesome. There are two types of leeches found in the low lying districts, the large dark horse leech and the small red jungle leech. The former inhabits fresh water, while the latter is found on shrubs and jungle grass. Although leech bites are not dangerous, they frequently become infected and lead to painful chronic ulcers. A leech should not be pulled off of the skin; when this is done its "stinger" is left in the wound. They can be removed with ease by touching them with a lighted cigarette or prodding them with a knife. The natives of this part of the world remove leeches by touching them with a small sack of moist salt that they carry tied to the end of a stick.

Various types of mites and ticks are found in cut over jungle land. One of these mites carries a serious disease known as mite typhus, and some of the ticks carry a tick typhus, somewhat similar to but milder than Rocky Mountain Spotted Fever. When traveling through mite and tick infested country, trousers should be tucked into the boots, and one should lie down in the grass only when it is absolutely necessary. It is well to remove the clothing two or three times a day and make a thorough search of the body for ticks. Do not remove a tick with the bare fingers, but place a piece of paper or cloth about the tick before touching it. They also can be removed in the same way as leeches, by prodding them with a knife or touching them with a lighted cigarette.

Because of the difficulty in keeping clean and dry, minor wounds such as leech bites, insect bites, scratches, cuts and burns, which would be of little consequence in the United States, become infected easily in this area. No matter how small or trivial, all wounds should be thoroughly cleansed and an antiseptic applied to them immediately.

There are many poisonous snakes, such as the Russell's Viper, the King Cobra, kraits, and a very poisonous sea snake. Many of these snakes live close to human habitations which they visit at night in search of food. On cool nights snakes like to get into warm places such as shoes and clothing. Therefore, carefully examine all clothing and shoes in the morning before getting dressed. Before getting out of bed at night turn on a flashlight to make sure that there are no snakes on the floor. Always look into cupboards, drawers, and other dark places before reaching in with your hand.

If bitten by a snake the patient should be kept quiet and medical attention obtained as quickly as possible. Do not give the patient a drink of whisky or of any other alcoholic beverage, and do not allow him to exert himself. Follow the procedure set forth in paragraph 128, FM 21-10. Start the treatment immediately. If bitten on an arm or leg apply a tourniquet just above the bite. This tourniquet can be made from a neck tie, handkerchief, bandage, piece of string, or vine. A cross incision one-half by one-half inch should be made over each fang puncture. These cuts should be from one-quarter to one-half inch deep, and are best made with a razor blade or small, sharp knife. Suction should then be applied for at least one-half hour. This may be done by either sucking with the mouth, using a glass breast pump, or by heating a bottle and applying its mouth tightly over the wound. Cooling of the bottle will produce considerable suction. If there are any cracks or sores on the lips or inside of the mouth place a small square of rubber, such as the rubber taken from a condom, over the wound to keep the snake's venom from coming in contact with the mouth.

Venereal diseases are common throughout Burma, particularly among the hill tribes of the north and the inhabitants of the seaport towns. Eighty percent of all of the natives in one district were found to have either syphilis or gonorrhea. Many of the native women are promiscuous and both professional prostitutes and clandestine pick-ups are common. The majority of these contacts suffer from gonorrhea and syphilis, and many are also infected with chancroid and granuloma venereum, two other serious venereal diseases. ☆

ANSWERS TO QUIZ ON PAGE 28

1. The C-54 is a FOUR engine TRANSPORT (or CARGO) plane with a TRICYCLE retractable landing gear.
2. (c) In the Aleutian chain. 3. (b) Africa.
4. The C-46 is a troop carrying plane. Upon the appearance of enemy fighters, evasive tactics should be adopted.
5. (d) When the salute has been returned.
6. (b) 120 steps per minute.
7. (b) C-87.
8. (a) Air Marshal Sir Arthur Harris.
9. (c) 45 degrees.
10. (c) The tendency of a plane to roll in the direction opposite to that of the prop rotation. 11. (b) Junkers 87.
12. (d) The boundary between the troposphere and the stratosphere.
13. (b) Out to the skeet range. 14. (b) Red.
15. (c) Guadalcanal.
16. (d) Following a railroad track.
17. (c) Cardiograph is out of place. It is used for recording movements of the heart; the other instruments are for recording weather elements.
18. B-25. 19. B-26. 20. A-20.

The AIRY TOUCH

"P" Shooter

Something about a fighter job
Just gives a man a thrill,
She kinda sets your heart a-throb,
You know she's built to kill.

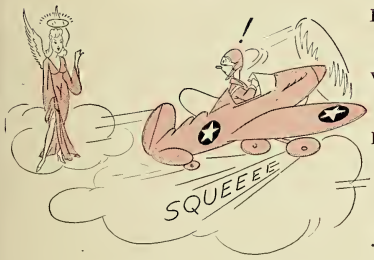
She doesn't have plush cushions,
The torque is pretty bad,
But she keeps right on a-push'n
Despite the hell she's had.

There's not much there but motor,
Some stubby wings and guns,
But there's plenty power to float her,
And she weighs about four tons.

It's true she's hot to handle,
And landing takes two tries,
But nothing holds a candle
To the ship that rules the skies.

When the gates of hell are open,
And the battle starts for true,
There's one thing for which I'm hop'n,
A "P" Shooter to fly me through.

—Lieutenant Jacob W. Dixon, Fighter Squadron, Alaska



The Weatherman's Lament

Bards through the ages have filled many pages
Extolling the Infantry's glory;
They love to enlarge on a Calvary Charge
And make it the theme of their story.

The boys in the tanks are beginning to rank,
And the caissons keep rolling along;
While pilot and plane will most always attain
Their full credit in story in song.

The reporters adore the parachute corps;
The medics come in for their praises;
But there's one bastard crew, a forgotten few,
On which glory's light never blazes.

They spend their dull hours in forecasting showers
And in judging the height of the clouds,
But anticipation of precipitation
Will elicit no cheers from the crowds.

Problems climatic are not so romantic,
As is shooting down Japs from the blue,
But bet your last dollar fliers would holler
If the weatherman failed to come through.

When the Bomber Command has a mission planned,
And is set to raise hell with the Jap,
There's question whether all's well with the weather
Enroute to that spot on the map.

That's the weatherman's call to get on the ball,
And to get all the dope for the flight;
He can't play the breaks, or allow for mistakes,
And no guessing—he's got to be right!

When there's nothing to clear he'll sit on his rear,
He's lazy, that point is conceded;
He'll loaf on the job, and he'll jawbone an ob,*
And ain't worth a damn—'till he's needed.

*Weather forecast.

—Pfc. Don H. Fields, 10th Weather Squadron

"Another near miss—it didn't go down the funnel!" —F. Wilkinson

The Cry of the Kee Bird

You have heard the wail of the siren,
As an ambulance sped down the street,
And mayhap you've heard the lion's deep roar
Down in Africa's grim desert heat.

Or the piercing cry of the tiger
At night, as he stalks his prey,
Or the locomotive's high shrill whistle
As it sped, through the night, on its way.

But these sounds sink to a whisper,
You've heard naught, I assure, 'til I've told
Of the blood-curdling cry of the Kee Bird
In the Arctic's cruel frigid cold.

This bird looks just like a buzzard,
It's large, it's hideous, it's bold,
In the night, as it circles the North Pole
Crying, "Kee, Kee, Keerist but it's cold!"

The Eskimos tucked in their Igloos,
Toss fretfully in their sleep,
While their huskies asleep in a snow bank,
Start burrowing away down deep.

For this cry is so awe inspiring
It freezes the blood I am told,
As the Kee Bird flies in the Arctic
Crying, "Kee, Kee, Keerist but it's cold!"

The Mounties, abroad in their dog sleds
Visiting these Wards of the Crown,
Often hear this strange cry and stare skyward,
With a fierce and sullen frown.

For odd things happen in the Arctic,
And many weird tales they have told,
But their voices drop to a whisper
At the cry, "Kee, Kee, Keerist but it's cold!"

And many a brave man on this Base site,
Strong and bold, from a Northwest State,
Are taking the first ship back to homeland,
To forget this fierce bird's song of hate.

They can "take it", it seems, in the day time,
But when the midnight hour is tolled,
They cover their heads in shameless fright,
At the cry, "Kee, Kee, Keerist but it's cold!"

So back to the States they are going
To sleep in a real bed, as of old,
To slip their strong arms 'round their loved one
Her fair slender form to enfold.

Then off to sleep in warm comfort,
And wifey's soft hand they will hold,
To wake, terrorized by a "Kee Bird" nightmare,
And the cry, "Kee, Kee, Keerist but it's cold!"

—Ed. J. Pritzinger

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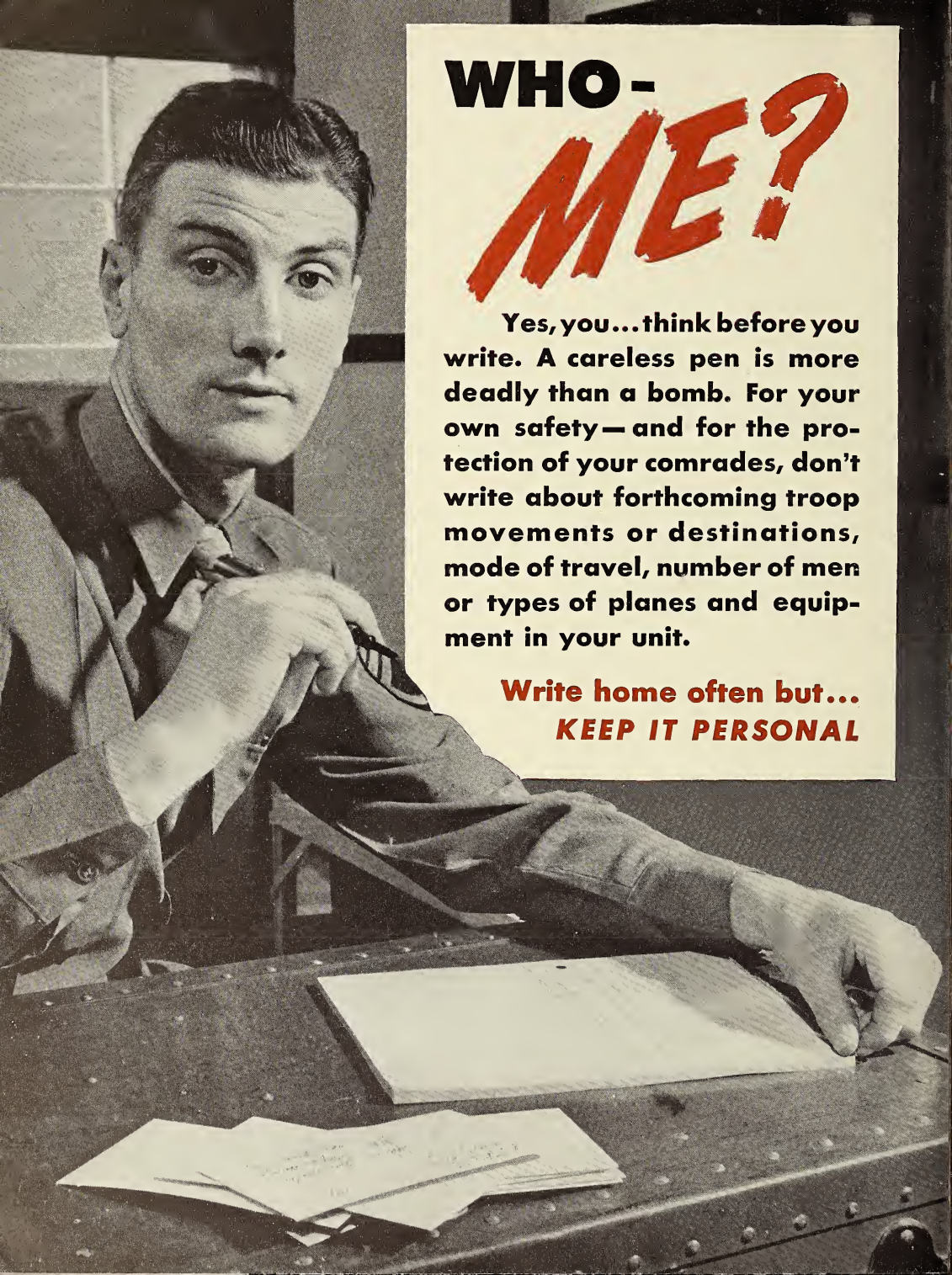
WHO-
ME?
Yes, you... think before you write. A careless pen is more deadly than a bomb. For your own safety — and for the protection of your comrades, don't write about forthcoming troop movements or destinations, mode of travel, number of men or types of planes and equipment in your unit.
Write home often but...
KEEP IT PERSONAL

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

JUNE 1943

Vol. 26 No. 6

JUNE 1943

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AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

June Brief

If fledgling fighter pilots heed the advice of one of the best in the business, they'll "get a chip on their shoulder" and keep it there. This comes from Colonel Robert L. Scott, Jr., former commander of U. S. fighter groups in China. Colonel Scott, whose combat record against the Japs includes at least thirteen enemy planes shot down, was asked to write an article for Air Force based on his experiences in the India-Burma-China theatre. The article appears on Page 6. Colonel Scott is now on duty at the AAF School of Applied Tactics, Orlando, Florida.

Years ago, students at the old Air Corps Tactical School at Maxwell Field, Alabama, foresaw the need for a school in aerial combat tactics and technique which would go beyond mere theory and concentrate on training under simulated combat conditions. Many of these old-timers, now Generals and Colonels for the most part, have seen their dreams come true with the establishment of the AAF School of Applied Tactics at Orlando, Florida. AAFSAT has as its first commandant Brigadier General Hume Peabody, who at one time served as Assistant Commandant of the tactical school at Maxwell. On Page 8 in this issue, General Peabody introduces the new school to personnel of the Army Air Forces.

Fast-moving, dramatic stories of combat have sprung by the hundreds, but for our money the story of Shorty Gordon, belly turret gunner on a B-17 operating out of England, ranks with the best of them. Shorty's exploits are set forth by Captain Bernard W. Crandell, former United Press writer now on duty with the Eighth Air Force. His article, "Angels Don't Shoot Guns," appears on Page 10.

"Prepare for Trouble," in the finer sense of the phrase, should bring to the mind of every airman the importance of emergency kits. A full discussion of the contents and proper selection of emergency kits and equipment currently in use by the AAF has been prepared for Air Force by the Arctic, Desert and Tropic Information Center. It appears on Page 34.

The little guy you see on the opposite page wandered into the Air Force Editorial Office a few weeks ago under the sponsorship of Stan Eckman, well known cartoonist who at present is working with the Western Procurement District of the Materiel Command. Mr. Eckman's "protege" made such a hit that we introduce him to all our readers. What he needs most of all right now is an appropriate, "air-forcey" name plus a few suggestions on duties he might perform. We'll be glad to receive your choice of a name for the little man and have you issue a few orders for his benefit. Mr. Eckman will do the rest.

Major Stephen L. Gumport, first flight surgeon on duty along the central African air route, relates his experiences in an article on Page 18. Since his return in February after more than a year in Africa, Major Gumport has been assigned to the Medical Division of the Air Transport Command Headquarters.

The personnel classification problem is as old as the Army—any army. An interesting study of the manner in which the problem is being solved on the squadron level by the Army Air Forces may be found on Page 39. The author of the article is Lieutenant Matthew Huttner, statistical officer for a fighter group being readied for overseas action. Formerly engaged in radio and public relations work, Lieutenant Huttner assumed his present duties after attending OCS, Miami, and the AAF Statistical School at Harvard University. Lieutenant Huttner was graduated from the University of Pittsburgh (M. A. in social science) and in 1937 received the John J. Pershing Medal for military citizenship as a result of his fine record at Citizens' Military Training Camp.

Tad has become AFTAD. So what? Simply this: the Training Aids Directorate, which was a part of the AAF School of Applied Tactics in Orlando, now has become the AAF Training Aids Division, an exempted activity under the supervision of the Commanding General, with headquarters at One Park Avenue, New York City. The Assistant Chief of the Air Staff, Training, exercises supervision for the Commanding General. The training aids section in Air Force this month is devoted to an explanation of AFTAD's field liaison organization, a round-up on available synthetic training devices and a background study on training literature. It begins on Page 26.

The front cover photograph, with its unusual portrayal in shadows, shows a flight of B-25s winging over a desert stretch in North Africa on one of the hundreds of aerial missions which contributed so vitally to the rout of Axis forces in that theatre.

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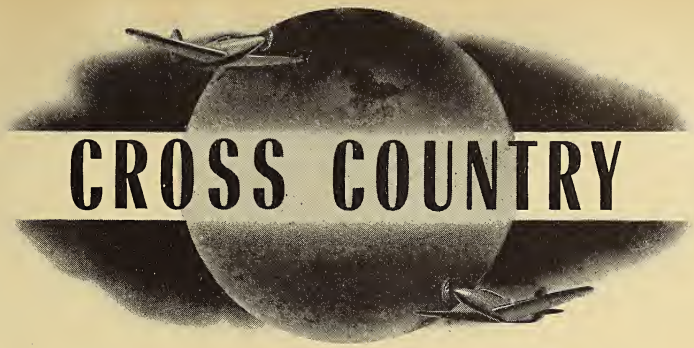


CROSS COUNTRY

The new air-sea rescue program, and other developments of the month within the Army Air Forces

A COORDINATED program to handle the rescue of air crews forced down on land and sea has been newly established by the Army Air Forces.

More and more attention has been given air-sea rescue work, but it has continued to be handled largely as a local problem. Now the responsibility for developing and supervising the operation of a working system rests with a single agency—the Air-Sea Rescue Wing of the Flight Control Command.

We can't give you all the details of the program, for much of it is still in the making, but plans call for air-sea rescue squadrons to be stationed throughout the world. These squadrons, some of which are now being activated, will be made up of specially trained personnel; many of the men in command will be those who learned forced landing procedure the hard way—from experience. The squadrons will operate in combat theatres and on the fringe of such theatres, as well as along our own shores and along air transport routes wherever such services might be required.

Special equipment will be brought into play. Plans call for utilizing helicopters, PT boats, dog sleds, snow plows and liaison planes, as well as conventional aircraft, to give all possible aid to air crews who have been forced down.

The first big job will be the standardization of procedures regarding the ditching of multi-engined aircraft at sea, and for bailing out, parachuting, and the like. Right now, the Command needs all the information and suggestions it can get, especially on the subject of ditching at sea. The experiences of crews who have been forced down will be most valuable. The Commanding Officer of the Command asks officers designated to question crews after ditchings to send in complete reports, which should include the pilot's own story and answers to such questions as: Was the pilot satisfied with the ditching procedure followed? If not, what does he specifically recommend? If the emergency equipment wasn't satisfactory, what was most in demand? The reports should include the type and model of aircraft and emergency equipment used. Such information should be sent to Headquarters, Flight Control Command, Winston-Salem, North Carolina.

The educational side of the program will be handled by the Air-Sea Rescue Section of the Command's Safety Education Division. Movies, booklets, posters and manuals will be used to tell you what to do in emergencies.

A manual now being produced in cooperation with the Bombardment Department of the Army Air Forces School of Applied Tactics will outline approved procedures for ditching medium and heavy bombers, and for individual bail-outs. A booklet, "Swimming Through Fire," soon to be available, will show you how to swim through fire in the event the water is covered with burning oil and gasoline. An air-sea rescue movie to be known as "Ditching" will outline the approved methods of ditching multi-engined aircraft.

Two manuals—"Jungle and Desert Emergencies" and "Arctic Emergencies"—are off the press and are being included in the jungle and Alaskan parachute emergency kits (Types B-2 and B-1). In addition, a limited number of the manuals will be available for use in schools and training areas.

A movie titled "On Your Own in the Arctic" will put the information contained in the Arctic manual in graphic form. Other movies now in the planning stage include "How to Live in the Tropics" and "How to Live in the Desert."

Supplementing these mediums will be two series of posters showing in step-by-step form the bail-out and ditching procedures for the B-17, B-24, B-25, B-26 and A-20. These posters will go to schools, operations offices and operational bases.

As the air-sea rescue program develops, its many phases will be covered in future issues of AIR FORCE.

MORE ABOUT HELICOPTERS

All official world records, including the altitude mark, have been broken during routine testing of the Army helicopter, and under stimulus of the successful tests, larger

Make your reservations early.

helicopters are under development by the AAF Materiel Command. In fact, it is reasonable to assume that ten to twenty place helicopters can be built; top-flight speed would be in the neighborhood of 150 miles an hour, utilizing the present principle of power.

We've mentioned that helicopters are planned for use in air-sea rescue operations. Also, tests now underway will determine to what extent this type of aircraft will be used in our anti-submarine work.

For the last seven years all military development work on rotary wing aircraft has been conducted by, or under the supervision of, the Army Air Forces. In the March issue of AIR FORCE we covered the Army's first experimental helicopter, which was officially accepted in May, 1942. The craft was a success but its performance, capacity and speed were limited. Much progress has since been made.

Upon completion of testing at Wright Field, production orders for the helicopter were given by the Army. From this production order the Navy is to get three experimental models and one service test model.

SUBJECT: COMPRESSIBILITY

Not long after we had completed work on the May issue and sent it off to press, a letter arrived from Colonel Ben S. Kelsey, author of the series of articles on compressibility which was concluded with that issue of the service journal.

The opening paragraph told us that Colonel Kelsey had dictated the letter in a West Coast hospital while nursing an ankle injury sustained in a bail-out from a P-38 during the course of a dive investigation. (He is now engaged in fighter aircraft research work for the Materiel Command.) It was too late to fill the Colonel's request and print his message along with the concluding article on compressibility, so we are doing it now. This is what Colonel Kelsey had to say:

"1. Having just had an airplane disintegrate with me in a compressibility dive during the course of flight research in this field, it seems as though some of the items covered in the compressibility discussion need more emphasis.

"2. At best, compressibility is an unpleasant and dangerous region closely associated with trouble. The principle of learning how to 'stay out' rather than how to 'get out' is of primary importance.

"3. The lift and balance, or trim, of the airplane depend on an entirely different type of airflow than that with which we are normally familiar, so that the usual change in attitude, change in flight path, or accelerations which we use normally to indicate what is going on, may no longer apply. A straight-down dive, for instance, may be trimmed with zero stick force, then with application of full tab, or destructive elevator displacements may produce no change in attitude or flight path. The maximum lift is limited, just as it is in the regions beyond the normal stall, so that changes in attitude, if attained, may produce nothing except destructive distribution of load on the wings or tail.

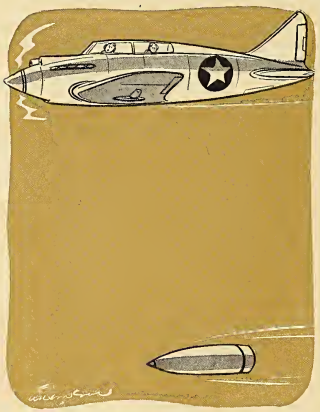
"4. Due to the speed, the aerodynamic forces are capable of shucking tabs, elevator, tails, and wings off a plane as easily as you would flick cards off the top of a deck.

"5. Recoveries must be limited to a slow and easy pattern, using moderate tab displacements and moderate stick force applications. It's a long way out and easy does it. Care must be exercised to ease off on recovery application as progress is obtained to avoid equally disastrous reaction as compressibility lets go its hold.

"6. The controls can be rigid, heavy, or sloppy, depending on the airplane and the flight condition.

"7. Avoid using ailerons or any control you don't need to avoid starting an over-balanced or flutter condition.

"8. Buffeting will usually be present and probably increases with recovery efforts. This



"Fast? Look what we're passing!"
— FRED WILKINSON

has to be endured and mild or moderate recovery procedure must be constantly maintained. However, the controls should be restrained from motion insofar as possible to avoid destructive oscillation. This applies particularly to ailerons.

"9. Don't let familiarity with the edges of the phenomena breed contempt. It only takes a little slip to have Old Man Compressibility grab you with one hand while he takes you apart with the other. The result can be more than a little alarming and confusing.

"10. Incidentally, parachute jumping at high speeds involves its own hazards. The harness must be particularly snug fitting if it is to stay on."

"11. We are on the track of solution, but the region of high speed, particularly above 20,000 feet, demands plenty of respect, and I am talking from the jail."

We don't wish for more bail-outs under such conditions, for Colonel Kelsey or anyone else, but we do hope to get more letters "from the jail," if such has to be. We can't think of a better start toward solving many of the problems confronting us—no matter what the field of work—than an exchange of ideas for the benefit of all personnel.

THOSE GROUND OBSERVERS

Stories of persistence, ingenuity and unfailing devotion to duty on the part of volunteer ground observers in the Aircraft Warning Service are legion. We mention here only a few of the instances which have come to our attention:

Sixty-four-year-old Charles Holmes and his dog Trixie spent 4,000 hours on duty during the first year of war at an observation post far up on the rocky, barren foothills of the western slopes of the Sierras behind Bakersfield, California. Trixie was taught to bark when he saw or heard a plane.

Two of the five members of the crew of an Army bomber which crashed about half a mile off the coast of Oregon were rescued thanks to the fast work of Observer Charles Voorhees, who saw the plane go down from his post near Seaside, Oregon, and flashed a quick message to the Portland Filter Center.

Mr. and Mrs. John Jeans saw a fighter plane fall into Fern Ridge Dam Lake near their home just outside Eugene, Oregon. Mr. Jeans went to the rescue in his outboard motorboat while Mrs. Jeans called a nearby observation post. Within eight minutes after the crash, the pilot, suffering from shock, was in the Jeans home and fifteen minutes later an ambulance, summoned by the ground observer, arrived to take him to a hospital.

Two observers near Sheridan, California, saw a truck and trailer skid off the highway on to the tracks of the Southern Pacific Railroad. One of the observers drove to another town up the line and an oncoming train was flagged to avert a wreck.

MORE LOST CHUTES

Captain Raymond A. Fitjar, commanding the 491st Bombardier Training Squadron, AAF Bombardier School, Midland, Texas, reports three chutes are missing. Their serial numbers are 41-1928, 42-53174 and 42-57119. Inventory your chutes and if you spot one of these numbers, notify Captain Fitjar.

VICTORY GARDENS

The War Department encourages the planting of victory gardens as a voluntary off-time activity at posts, camps and stations, providing (1) approval is granted by the CO so as not to interfere with the primary mission of training, (2) planting is done where the equipment and tools are on hand or readily available and no additional farm implements are necessary, and where soil is suitable and plots are reasonably available to quarters, (3) gardens are of such size and are planted with "such vegetables" that military personnel in the time available can care properly for the gardens, and (4) that food so produced will be for the consumption of military personnel only and not for sale to civilians.

First word of an Air Force victory garden in actual operation comes from Bolling Field where farm-minded personnel looks to a cultivated 38-acre tract for some

10,000 cabbages, 20,000 tomatoes, 5,000 eggplants, 5,000 pepper plants and eight acres of corn. First Lieutenant Frank R. McFarland, Jr., former farm manager and graduate of the University of Maryland Agricultural College, is in charge of the project as Post Farm Officer.

Bismarck Sidelights

In answer to a cabled request, these sidelights on the Battle of the Bismarck Sea, which we discussed last month, were dispatched to AIR FORCE by Headquarters of the Fifth Air Force in the Southwest Pacific:

Lighting a Fuse

One incident that occurred early in the three-day engagement last March had much to do with the ultimate outcome. It involved the lone B-17 lost in the battle. The crew of this bomber was forced to hit the silk after the ship had been set ablaze by enemy fire. The men would have had only the barest chance of survival once they touched the surface of the water as the sea was filled with sharks. But these crewmen didn't even get that chance. As they floated slowly downward about a dozen Jap Zeros broke off their combat with P-38s and made pass after pass at the airmen dangling defenselessly in their chute shrouds. The scene was witnessed by all our flyers engaged in the fight, and others were given a complete fill-in on details later. From that moment on, American airmen gave no quarter. Even the heavy B-17s began diving on ships and barges, their concentrated fire sending smoke, flame and debris high into the air and littering the sea with struggling Japs. The sharks formed a mop-up crew and had a field day. Sharks came from miles around to account for a large share of the estimated 15,000 Japs who lost their lives in the engagement.

Graveyard

Before the B-17s, the B-25s and the A-20s, the P-38s, the P-40s and P-39s of the Army Air Forces, plus the RAAF Beaufighters and Catalinas, called it a day in the Bismarck Sea encounter, all that remained of a 22-ship Jap convoy with its tons of equipment and thousands of troops were oil slick splotches, debris of shattered cargo and escort vessels, smashed hulks of lifeboats and barges, and the tattered bodies of Jap soldiers and sailors. This was why the Bismarck Sea became known to the officers and men of the AAF who took part in the engagement as the "Bismarck Graveyard."

Weather Break

When the battle opened up,—in fact when the lone B-24 on reconnaissance first spotted the Jap convoy, the elements favored the enemy surface craft. Our attacking planes could only strike and hope for results; they couldn't see. But at 1000 o'clock on March 3 the cloud curtain rolled back. There in plain view and under almost cloudless skies bobbed the bulk of the enemy ship concentration. On that day every available plane was thrown into the task of demolishing the Jap convoy. (Continued)

TIPS FROM THE ARCTIC, DESERT AND TROPIC INFORMATION CENTER

AIRMEN on combat missions in the Southwest Pacific have taken to wearing G. I. shoes, paratroop or marine-type boots instead of the flying boot. Reason: Bail-out experiences reveal that flying boots frequently snap off in descent, resulting in serious discomfort and injury when ground travel on bare feet is attempted over coral-strewn areas, hot stony terrain, or in jungle bush.

IT'S A GOOD IDEA *for crew members on flight missions in any theatre to provide themselves with a good shoulder-type holster for small arms. Web-type or leather pistol belts around the waist are frequently broken in parachute descent; often the weapon falls out of the conventional holster. Loss of the weapon may mean the difference between life and death. A good shoulder holster is the best insurance against such loss.*

A RECENT Dick Tracy adventure depicts that stalwart hero rubbing frostbitten skin with snow. The great Tracy ought to know better. NEVER RUB SNOW ON FROSTBITE! It's a dangerous thing to do because (1) it increases the freezing; (2) the rubbing tends to break the frozen tissues and will cause open wounds and possible infection. Slow thawing is the answer, Dick. For example, the right way to thaw a frozen hand is to warm it against the skin under your armpit, against your chest or between your legs; a frozen foot can be thawed between a companion's thighs or against his abdomen. And Dick, *don't ever use hot water* to thaw frostbite. Cool or lukewarm water is all right.

AN OPERATIONAL hazard in desert flying, especially at takeoff and landing, is encountered in the sand-swirls and minor whirlwinds generally found close to the ground. These occur only during the day and are easily seen. They should be watched for and avoided.

ARCTIC TIP: A hot thermos bottle may be kept hot much longer by wrapping it in a sleeping bag, heavy sweater or other insulating material. At extremely low temperatures there is danger that the cork may freeze in; to prevent such freezing fill the thermos to overflowing so that the hot liquid remains in contact with the cork at all times.

THE SECRET *of driving motor vehicles in desert sand is to keep rolling with as little wheel slippage as possible. Don't use excess power and spin your wheels. Nothing will get you stuck quicker or more thoroughly. If you come to a standstill, don't try to get out by spinning the wheels. You'll only go in deeper. Shovel the sand away from in front of both rear and front wheels or decrease your tire pressure. If you must stop in sand, stop on top of a hill or a mound so that you can start downhill.*

SOME IDEA of the character of the global war we're fighting is reflected in these facts: The hottest spot on earth is Azizia, Tripoli (in the African theatre) where a shade temperature of 136° F. has been recorded; the coldest place is at Yakutsk, in Siberian Russia, where 90° below Zero has been reached.

CONTRARY *to popular belief, liquor is no asset in Arctic regions. Physiologists tell us that alcohol causes the blood vessels to dilate, which in turn results in accelerated heat loss and more-rapid-than-normal cooling. Don't be deceived by that rosy glow or warm feeling you get after a shot of the stuff. You'll just be inviting quicker freezing. Liquor in the North Country has its customary social advantages but it is not a fortifier against freezing cold.*

INSECTICIDES *for jungle fighters are now packed under pressure in tomato-can-size metal containers. Pressing a valve releases a bug-blasting mist that fumigates a regulation puptent in a few seconds.*

The Arctic, Desert and Tropical Information Center welcomes contributions from all Army personnel with knowledge of the non-temperate theatres of operation. Submit to: Arctic, Desert and Tropic Information Center, Eglin Field, Fla.

Slap-happy Jap

The intensity of the March 3 raids, the accuracy of AAF bombs and the general fury of American airmen threw enemy defenders into confusion. One Jap cargo ship inadvertently rammed another, but no one will ever know whether the collision was of sufficient force to sink either ship because within a few moments both were destroyed by American bombs. Our planes attacked from all directions. Anti-aircraft guns on the ships were waving madly about, trying to fire everywhere at once. Several times our medium and light bombers roared in mast high and encountered no flak opposition at all.

Pop Gun

B-17 Waist Gunner Sergeant Henry Garcia of Los Angeles had the last laugh on the boys who kidded him for taking his rifle along on a mission. The sergeant was working his machine gun overtime holding off Jap Zeros when suddenly his ammunition gave out. Jap pilots, seeing Sergt. Garcia's fire cease, moved in for one more pass on his side of the B-17. The sergeant jammed his rifle full of tracers and let go at the oncoming Zeros. The ruse was successful; the Japs mistook the rifle fire for machine gun tracers and veered off without causing any trouble.

Just a Reminder

Take stock of these tips published for your benefit at the suggestion of the Flight Control Command:

Harness

Why don't more pursuit pilots use the shoulder harness? With a crash coming up, all the pilot has to do is pull the locking lever and the harness will give him complete protection from head and face injuries resulting from impact with the dashboard or gunsight. When he wants to get out it's no trick to release the lever or simply slip out of the harness. Remember that the harness is there for your protection and the protection is adequate—but only if you're wearing the harness.

Night Adapter Goggles

Apparently not all night-flying pilots of the AAF are provided with dark-adapter goggles, or know how to get them. The goggles in question are officially known as "Goggles, Assembly, Polaroid type D. A., Class 13, Stock No. 8300-343575" and can be obtained through the regular supply channels of any organization by applying to the Air Service Command.

The goggles which have red lenses, are to be worn by pilots for at least thirty minutes before taking off after dark. They do not interfere with the normal use of the eyes such as reading and playing cards, but they greatly increase the probability that such enjoyment can be carried on indefinitely.

Cap Spike

You probably never considered your cap a dangerous article but it can be.

Reports have been received of flying personnel suffering some nasty gashes from the end of the screw post on the service cap insignia when the cap gets jammed down during rough weather.

Take a look inside your cap, and if you have a half- or three-quarter-inch spike pointing at your forehead you'd better have it cut or filed off.

A Clarification

The need for clarification of two statements appearing in the Cross Country section of the April issue of Air Force has been called to our attention.

"Most conscientious bombardier I've ever seen."

—CPL. PAUL J. KAATZ

In explaining the procedure to be followed by enlisted men in applying for aviation cadet training, it was reported that the company commander had the authority to indorse or reject the enlisted man's application. Actually, the company commander cannot reject the application, but has authority only to forward the application and other necessary papers, with his recommendation and appropriate remarks, to the Commanding General of the proper service command. It is also called to our attention that a recent directive from Headquarters to the Commanding Generals of the Air Forces and the Air Forces Commands states:

"Because of the urgent need for greater numbers of aviation cadets, it is desired that you bring this opportunity to the attention of every potential candidate and see that his immediate superior officer does not disapprove the application or subsequent transfer."

The second statement in question has to do with the new bombardier-navigator training program. We reported that those bombardier-navigator trainees who are appointed flight officers upon completion of the first phase of their training will be commissioned Second Lieutenants on completion of the second phase. Actually, such flight officers will be commissioned Second Lieutenants *provided* such a commission is recommended by a board of officers. Otherwise, they remain flight officers.

Air Force is indebted to the Office of the Assistant Chief of Air Staff, Training (Military Personnel Division), for making these clarifications.

Scrap

From San Angelo (Texas) Army Air Base comes the observation that the bombardier cadet of the AAF Flying Training Command is among the top contributors in the Nation's scrap drive.

"Every time a cadet at San Angelo drops a 100-pound practice bomb," this statistically-minded correspondent reports, "he adds 15 pounds of metal to the scrap pile. At the present rate that adds up to something considerably over 7,000,000 pounds a year."

Volley Ball

It has been reported that a "bay chief" of a training squadron at the Advanced Flying School, Altus, Oklahoma, placed a notice on his bulletin board that all men must get up at 5:30 a.m. to clean the barracks. He added a penciled postscript: "If you play ball with me, I will play ball with you."

A khaki-clad wag pinned a note beneath the notice:

"Dear Sergeant," it read, "Sorry, 5:30 a.m. is too early to play ball. We will be glad to play ball with you at eight. Sincerely, The Opposition." (P.S.—The game started as originally scheduled.)

From the Commanding General, Army Air Forces, dated April 22, 1943:

To all personnel of the Army Air Forces:

In violation of every rule of military procedure and every concept of human decency, the Japanese have executed several of your brave comrades who took part in the *first* Tokyo raid. These men died as heroes. We must not rest—we must redouble our efforts—until the inhuman warlords who committed this crime have been utterly destroyed.

Remember those comrades when you get a Zero in your sights—have their sacrifice before you when you line up your bombsights on a Japanese base.

You have demonstrated that the Japanese cannot match you in aerial combat or in bombardment. Let your answer to their treatment of your comrades be the destruction of the Japanese Air Force, their lines of communication, and the production centers which offer them opportunity to continue such atrocities.

Bath

At one stage in the rout of Axis forces in North Africa, American troops captured among other booty a real, honest-to-goodness porcelain bathtub which probably adorned the quarters of some ranking enemy field officer. Between stabs at the retreating Axis troops, enlisted men took turns sitting serenely in this prize of war, dreaming of those little tiled rooms at home, while their pals poured in North African water from buckets.

On Land in a Life Raft

Rubber life rafts can come in handy even on dry land, take it from First Lieutenant Sam Constantino, Air Transport Command pilot, who recently brought his ship down for a crash-landing among the African sand dunes. Lieutenant Constantino and his crew inflated the life raft and used it to good advantage as protection against the cold wind at night. Incidentally, Lieutenant Constantino and his crew made it to safety by hitching a ride with an Arab camel caravan after seven days of fruitless wandering.

Page St. Patrick

When the 1,200-acre tract was cleared near Orlando, Florida, as the site for Headquarters of the AAF School of Applied Tactics, engineers found the terrain a favorite playground for hundreds of snakes. Even after AAFSAT officers began to move in and set up training classrooms and staff offices, the reptiles continued to put in an occasional appearance to protest this intrusion. Most of the nuisance-makers were put to death and promptly forgotten—physically speaking. But not so with a big, fat cottonmouth moccasin and a coral snake which happened to meet their timely end near the medical buildings of the Air Service Department. True to his medical background, Major G. W. Holt, flight surgeon, pickled the specimens in alcohol. They now repose harmlessly, though prominently, in glass jugs on the Major's desk. This is the same Major Holt, incidentally, who wrote "Why Black Out?" appearing in the May issue of Air Force.

Plague

A corporal now stationed at an Alabama airfield attributes his recent divorce to mother-in-law trouble. Comes now word that his ex-wife's mother has been made a third officer in the WAACs, and is headed —yes, to that same Alabama field. Naturally, by reason of rank, she will be one of the corporal's superiors. Anybody know of a nice soft berth for this guy in New Guinea?

Handy Gadgets

In the soon-to-be-ready hopper at Wright Field are these items which are destined to make life more pleasant for airmen who are forced to exchange their planes for rubber life rafts:

A salt water still, which handily converts ocean brine to pure drinking water; a sling-shot device for better seagull - shooting; a special mirror capable of reflecting the sun's rays to attract the attention of planes flying as high as 5,000 feet, and a vest-pocket container which, with a minimum of adjusting, can be used to catch and store rainwater.

Wrong Room

Sergeant Alvin O. Crabbe of the finance staff has inadvertently become the champion test-taker at the Newport (Arkansas) Army Air Field. Called to appear before the O. C. S. Board several weeks ago, Sergeant Crabbe was directed to the ground school building for the necessary examination. He was ushered into a classroom, handed a sheath of papers and told to get to work. For three hours Sergeant Crabbe sweated out the test and, turning in his papers, he inquired of the attending officer if this exam represented a departure from the usual O. C. S. test. Whereupon the astonished officer informed Sergeant Crabbe he had just completed a difficult examination for Army Specialized Training Program. The O. C. S. Board had been in session next door. The sergeant's appearance before that body was promptly re-scheduled for the next meeting.

P. S.—He scored exceptionally high on the A. S. T. P. test.

"I ran out of ammunition!"
—Fred Wilkinson

Branch Bank

Our attention has been called to a banking service scheduled to begin at Sheppard Field, Texas, about June 1. The First National Bank of Wichita Falls, Texas, is opening a branch at the post, offering the usual banking privileges to military and civilian personnel with the exception of making loans. Similar enterprises have been established at several other Air Forces installations.

Supply Lines

Some interesting figures on the movement of cargo and troops in this war as compared to World War I have recently been divulged by the War Department. Troops transported overseas during the first year of war totaled 891,827; the figure for the same period during the last war was 366,603. Cargo shipped to overseas troops, not counting that consigned to our allies, averaged 82 pounds per man per day, as compared with 43 pounds per man per day in 1918-19. During the first year of our participation in the last war, approximately 1,725,000 measurement tons of Army freight were shipped overseas, as compared with 10,474,923 measurement tons in the comparable period of the present war. In one month last year the tonnage figure reached 1,554,127.

These figures do not include freight now moved by air transport, which is made up of articles of greatest strategic importance. As the projected program for the construction of transport planes is realized, more and more troops and larger and larger tonnages of cargo will be handled by air.

Allied Insignia Recognition

An instruction program has been inaugurated to enable U. S. Army troops to recognize more readily the insignia of rank in the combat forces of other United Nations. All training Air Forces and independent AAF Commands in the continental United States have been ordered by General Arnold to give instruction in recognition of United Nations insignia to personnel destined for overseas duty as "an essential part of military training."

Commanders are warned not to give instruction which obviously pertains to a particular theatre prior to movement of any unit to a staging area but rather instruction which pertains to all theatres in order to avoid revealing the unit's ultimate destination. Insignia identification posters designed to aid in the educational program may be obtained through the Special Service Section, Army Service Forces. —The Editor.

GET A CHIP ON YOUR SHOULDER!

By COLONEL ROBERT L. SCOTT, Jr.
Former Commander of U. S. Fighter Groups in China

Some fifteen hundred feet below the blue waters of Victoria Harbor were rippling in the light of the setting sun. Some of those waves were caused by the wind but a few of them started with the splash of nineteen Japanese Zeros which seven of us had shot down in the last three minutes.

Just then I crossed the southeastern tip of Hong Kong Island and saw one more silhouette of an airplane. My gun switches were already on, my gunsight was reflected brightly in the armor glass of my windshield. I moved to attack the other ship.

There was not an instant of debate whether it was a friendly plane, a shadow, or a bird. With everything forward—prop control and throttle—I took military power from the throbbing engine and attacked.

A split second before my tracers would have rattled from the six fifties of the P-40, I saw the other ship wig-wag its wings. Then I heard a Texas drawl, "If that's a P-40 in front of me, wiggle *your* wings."

I mean I "wiggled" them, too, for the guns of the other P-40 were pointing right at me and you don't argue or hesitate with a P-40's guns. Ask the Japs in China.

The simple fact that these two American fighters were the last ships in the air over Victoria Harbor on that afternoon of October 25 meant the twentieth plane would not ripple the water that day. We were both *attacking*. There was not a single thought of defense or deliberation about whether the other plane was a friendly one. There can't ever be—or you will become the twentieth ship some day.

As for the two of us that afternoon, we were so glad to meet each other that we went into formation and arrogantly engaged in acrobatics as we passed over Kowloon and Canton en route back to our base in Free China.

This arrogance we call the "chip on the shoulder" that is just as necessary to fighter flying as formation or gunnery. It's the quality that gave western gunmen itchy trigger fingers. It's the heads-up way you have to play in this fast moving game in the skies.

To adopt it you must have developed a neck like an owl that lets you look around constantly while you're flying. You must have developed it while you were learning to fly and it must have grown with you until it becomes a movement that is as natural as blinking the eyes.

You've got to know that the little piece of dynamite you call your home in the air is a flying engine with guns tied on and with you as its brain. You live or die together as that brain decides.

Your mind is at ease once you are on a mission for there can be no doubt but that you are flying the best equipment in the world, that you have received the best training anywhere, that you have everything to fight for. You can laugh and know that any enemy pilot who faces you in combat is a fool and will die. Oh, some lucky bullet from the ground may get you, perhaps some ricochetting burst from an enemy plane. But this man in front of you shoot you down? Never in all the world. For you've learned that you are better than he; you are what you have wanted to be all your life, the actuating brains of one of the greatest weapons in the world. You have six to eight .50 caliber guns in your wings or synchronized in your ship's nose and perhaps you are flying one with cannon.

Stop and think for a moment of what you have read of machine gun and rifle companies and battalions in other wars and then realize that you have at your very finger tips the trips to more shots per minute than the infantry battalion.

"Let your every thought be an offensive one and be mad as hell when you can't find an enemy to battle."

Your first mission is to escort bombers and get the offensive arm of our Air Forces to its objective and away. But you can also carry bombs and learn to lay them in the groove. Did you know that those six fifties on a P-40 can sink a Japanese destroyer alone? They can, but for effective action you, first of all, must know your ship.

FLYING must be second nature to you. You must be so good in formation flying that it has long since become a pleasure for you to sit there on your leader's wing or to assume the responsibility of leading other men. Your gunnery must be at least that of a sharpshooter, preferably that of an expert.

You don't have to be tall or short, young or old, rich or poor, fat or slim. There is no pattern for a fighter pilot. His physique waxes and wanes as the moon. But the quality that must be there is a spirit of adventure. It's the certain something that makes you want to fly the little ships alone with no co-pilot to talk to, no navigator to turn to for directions, no bombardier to aim your load, and no gunners to keep the enemy off your tail. This is no reflection on the pilots who want to fly the twin engine bombers or the heavy four-engine ones, or those who look to a life in the transports. They are all just as necessary as you. Let them fall down on their job and the battle is lost.

But you are where you are because you want your job more than anything in the world. You carry that chip of superiority along with you all the time because your character in the air must be that way. When the chips are down, you know you stepped into the mess all by yourself and it's up to you to get out—by your own ability and the knowledge of what your ship will do. But by your own proper planning beforehand you can enhance your chances of escaping tight squeezes.

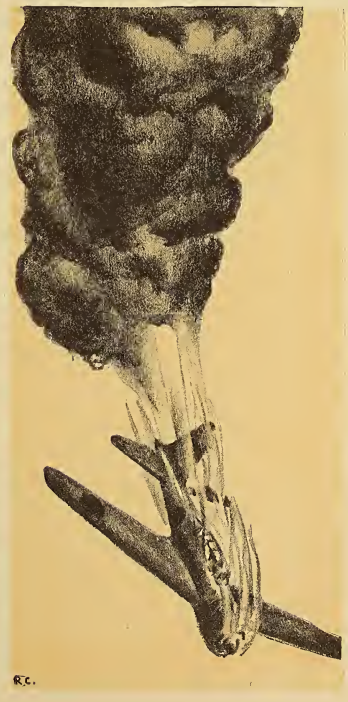
The one thing that you must never do is wonder: Can I do this? Should I be here? Should I wait and see if that is one of our ships? Am I meeting a better pilot?

You must forget everything but that you are the best in the world. You must have long ago learned to shoot so that as each Jap makes a head-on run against you, you will be glad that he helped aim the guns for you. You must be saying, "You poor sucker, I'll kill you long before you come within range with your poor little guns."

Yours is the job where arrogance in the air is a necessity—you are looking for a fight. You are mad if you escort bombers and the enemy does not intercept. How are you going to destroy his air force if he doesn't come up to fight?

Afraid in combat? It will never enter your mind. There won't be time for prayer or for fear. Sometimes when it's over you'll know that someone at home must have prayed for you. And you may experience fear later but not in the fight.

There was always a fear gnawing at my heart before the take-off for action. The night before I could never sleep. I could shut my eyes and see Zeros climbing into the bomber formation with cannon going, making their little smoke rings that floated out in front of the Japanese fighters. I would almost fall asleep with these images before me but then as I tugged desperately to get my fighter to them I would lose the race and see my own bomber go down in flames. Then I would jump wide awake for the hundredth time that night. Sleep would never come. Not from personal fear, but from fear that I would fail in my mission. Fear at first that combat would be unnatural for me, but never fear that some little bullet would hit me. I was too arrogant for that and you will be. You'll worry just like all of us do as you try to sleep the night before. Then as you stand around and wait the interminable seconds for the operations officer to brief your mission, you will be sharp and cross with the crewmen. You may even gripe at the Chinese boy who serviced your ship for stepping on your chute, but it will be from the tension of the moment. When you take off you'll be the happiest man in the world. Soon you'll say to yourself, why don't the devils come up? Why?



And there they are. At the first instant, the steepness of their climb chills you, then their numbers, but now you remember there aren't seven of you this time. There's a whole group, and another is sitting up there in the sun as support, and the reserve is higher still, and this is where the Jap dies and you're attacking without realizing your move.

In seconds, it seems, it's all over and you're looking around in a sky that's filled only with American ships. And the white stars on the wings and fuselage look to you like a part of the United States—Main Street or the State Capitol or the Mississippi River. And maybe a cheer will rise to your lips and the world will blur from a tear that comes hot in your eye. You'll think it's a privilege to be here and do this job for the greatest country on earth, and you will realize that this is the way to keep the country you love just the way you want it. You'll insure by hundreds of such raids that your wife will live the way she was living when you first knew you loved her, your little boy will have the same future that you've always planned for him, your Main Street—your American Way of Life—will go on.

IN a second that emotion passes and you're on the way home to base, sweating out your navigation and your gasoline. Then you're telling the boys who haven't been out yet that it's a cinch. "They blow right up when you get a good burst of fifties in on them. But, boy, they can climb!"

Then the routine begins all over—the impatient waiting and the griping for action.

It's going to do you and America a lot of good to see these hellholes we fight in, for when the war is over we will then understand the sacred thing that we have.

But as you ride out over the many fronts of this war, ride in confidence that you are better trained, you are in superior equipment, and you can outgun and outshoot any ship in the skies.

Let your every thought be an offensive one and be mad as hell when you can't find an enemy to battle.

Above all, never wait to be attacked. Get your gun switches on, get your gun sight on, get your controls on the throttle quadrant forward "to the firewall" for military power —and *attack, attack, attack!* Every fly speck, every vulture, everything that may be a plane is your target. Attack before he attacks you. Never have a defensive thought. ☆

FLORIDA'S COMBAT THEATRE

By Brigadier General Hume Peabody

COMMANDANT, ARMY AIR FORCES SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

A FLIGHT of B-17s roars out over the Gulf from Florida's west coast on a late afternoon bombing mission.

The distance between its base on the mainland and the target—marked by an aluminum slick on the surface of the water—represents the exact distance between an Allied bomber base in North Africa and an enemy airdrome on Sicily.

The B-17s reach their objective and drop their bombs. The mission progresses under conditions copied from a raid which actually had taken place several weeks before in the North African theatre.

Back on the mainland a night fighter squadron is alerted to intercept a flight of "enemy" bombers approaching the Florida coast. A completely equipped and staffed Aircraft Warning Service has picked up these "raiders" — represented by our returning B-17s—and is plotting their course as they move in from the Gulf.

Searchlight batteries and anti-aircraft units, kept advised of the exact location of the bombers, are ready to spring into action.

The night fighters take off and, under the guidance of a central Controller, move out to intercept the raiders. Coastal searchlights suddenly come to life, catching the bombers in their powerful beams and carrying them along despite violent evasive efforts by the raiders to escape the shafts of light. With their targets standing out clearly, the night fighters then move in swiftly for the "kill." Here, too, actual combat conditions have been simulated in detail.

THESE demonstration missions are typical of those flown daily as an integral part of the training program at the Army Air Forces School of Applied Tactics.

Back of such missions are days of academic training at AAFSAT in up-to-the-minute tactics and technique, lecture course in maintenance and supply, in aviation medicine and combat communications, instruction in air crew briefing and intelligence interview, and the countless other details that go to make a typical air force.

For all practical purposes AAFSAT is an air force—an air force operating in a "war theatre" which embraces some 8,000 square miles of territory in west central Florida. The AAFSAT air force has a Bomber Command, a Fighter Command, an Air Support Command and an Air Service Command.

The Author

From three of the twelve airdromes in this theatre heavy and medium bombers fly countless missions copied in detail from missions flown in combat theatres over the world. Fighters operate from five other bases, one of them a combat school for night fighters, the first in the United States.

Air support units, including light and dive bombers, troop carrier planes and gliders, and observation aircraft, are based on three separate airdromes. The other base is a "forward area" airdrome hacked out of the Florida brush by aviation engineers and used to simulate rough conditions to be encountered in many of the war theatres.

In addition, a complete air service organization from a general depot—the only one of its kind in the country—to the lowest field echelon operates full time to keep both planes and personnel in A1 fighting shape.

At AAFSAT headquarters in Orlando, where all academic work is accomplished, the high command sets up demonstration missions, keeps careful tab on their progress through complete operations center facilities, and makes detailed studies of the results.

OUR primary purpose at AAFSAT is to train air force cadres—key personnel framework for all new combat groups—in the latest combat tactics and under operating conditions approximating as closely as possible those with which these officers and men will be confronted in the various war theatres.

To accomplish this mission we are not operating on theory, nor on the mere basis of intelligence reports alone. We have as instructors and advisors outstanding combat-experienced officers, many of whom have spent more than a year in war theatres around the world and participated in one important aerial mission after another. In addition to these seasoned AAF instructors, AAFSAT enjoys the valuable assistance of Royal Air Force veterans in setting up training courses and field problems.

In the Air Defense Department of AAFSAT alone, more than sixty instructors have had overseas experience. Among them are Colonel Robert L. Scott, Jr., whose military career in the Far East has been one of the most brilliant of the entire war; Colonel Orrin L. Grover, who served through the Bataan defensive in the Philippine campaign and later in Australia; Lieutenant Colonel Oswald Lunde, whose combat service has taken him to the Philippines, Australia and North Africa; Lieutenant Colonel Walter B. Putnam, a veteran of the Southwest Pacific theatre; Lieutenant Colonel Winston W. Kratz, who was assistant A-3 of the Eighth Air Force for more than nine months; Colonels Arthur B. Nicholson and Thomas J. Cody, both veterans of the North African campaign; Major Charlie R. Bond, a member of the American Volunteer Group in China for more than a year and a half, and Captain Reade F. Tilley, who served with the RAF in England and Malta before transferring to the Army Air Forces.

Several former officers of the 19th Bombardment Group are on the staff of Bom-

Introducing the Army Air Forces School of Applied Tactics where key personnel of new Air Force Groups get a taste of modern air warfare before going overseas.

bardment Department at AAFSAT, including Lieutenant Colonel James T. Connally, Group C.O. for several months in Australia. Majors S. R. Patterson and Max Fennell, who served with the Ninth Air Force in Cairo, also are training bomber personnel. Lieutenant Colonel C. B. Whitehead, with the RAF Bomber Command during the early days of the war, is chief of academic instruction for the Department.

In air support, Lieutenant Colonel Ronald D. Hubbard and Major James B. McAfee are passing on techniques in light and dive bombing they used successfully as members of the 3rd Bombardment Group in the Southwest Pacific. Their former C.O., Colonel John H. Davies, took a leading part in setting up AAFSAT's air support program. Lieutenant Colonel C. E. Hudgens, who participated in the troop carrier mission from the British Isles to North Africa at the outset of the campaign in that theatre, offered valuable aid in the troop carrier training program while at AAFSAT with his own cadre.

These are but a few of the combat veterans lending a touch of war realism to the training courses. It is under the guidance of these officers that another purpose of the school is carried out—the continued development of tactics learned in combat theatres.

Afforded the use of the latest types of equipment, AAFSAT instructors and students are able to explore new techniques, put them to rigid tests and, if they prove successful, pass them on to war theatres by the time the new equipment gets there. Thus AAFSAT becomes a tactical laboratory as well as a school of instruction in tactics.

By the same token, new tactics developed in combat theatres from time to time are made a part of the training program at AAFSAT. This is one of two principal methods employed to keep AAFSAT instruction from becoming static. The other is represented by a regular turnover (about five percent) of instructors. Now and then instructors leave AAFSAT to head up their own groups and squadrons bound for war theatres, and fresh instructors arrive from combat zones to replace them.

THOSE of you who come to AAFSAT will find at Orlando the school headquarters and some 1,200 acres of classrooms, buildings housing synthetic training devices, A.W.S. filter and control centers, barracks and mess halls. Here is where you will receive your academic training.

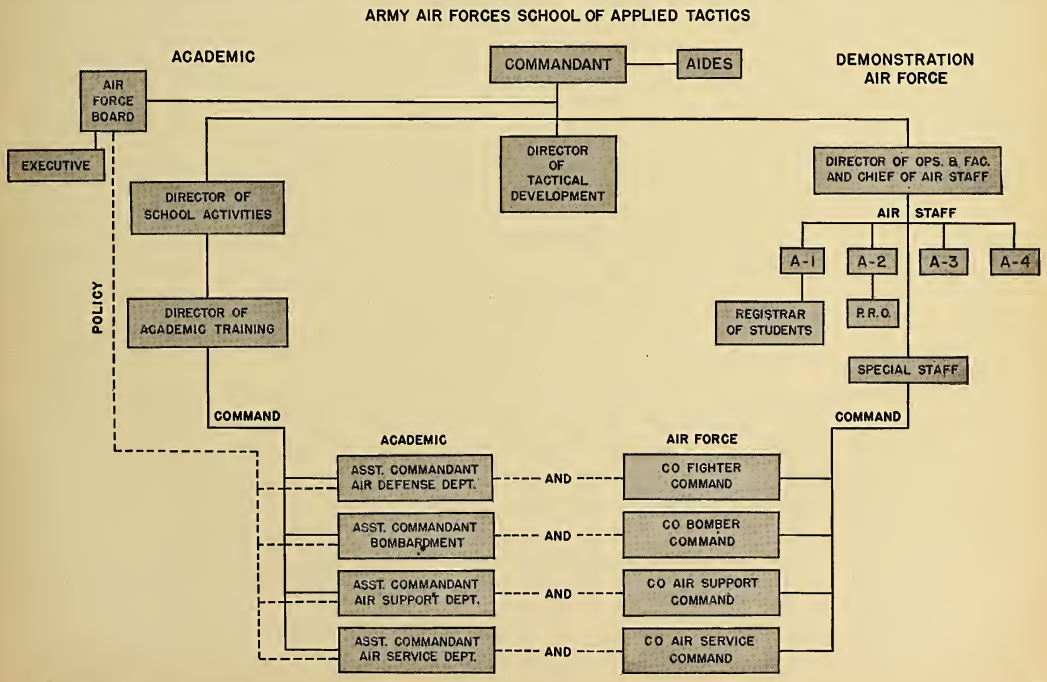
Chances are you will come as a specially selected member of a cadre—for the purpose of illustration, say a bombardment cadre. In your unit, picked from one of the training Air Forces in the United States to form the nucleus of a new Bombardment Group, will be about 150 officers and men ranging from the Group C.O. to supply sergeants and gunners.

At the outset you will receive a four-day orientation course. This goes for everyone coming to AAFSAT, from corporals to generals. The course brings students up to date on broad developments within the Army Air Forces and refreshes their minds on military topics which were supposed to have been absorbed in earlier training.

Operational personnel—pilots, bombardiers, navigators, radio operators and gunners—then will hear lectures on tactics employed in the various combat theatres and operate the latest synthetic trainers in practical illustration of the lectures. Meanwhile, the administrative and service personnel of the cadre—adjutants, intelligence officers, medical officers, maintenance men, supply sergeants and the like—will take classroom courses in the Air Service Department.

Your cadre will re-form for the final phase of the training at one of the AAFSAT bomber airdromes. There you will eat, sleep and operate under simulated combat conditions for about two weeks. You who are air crew students will fly missions with officers who know first hand what it means to push through damaging flak and fight off enemy interceptors to reach a target in the Mediterranean, or in Western France, or in the Solomons.

(Continued on Page 29)



Shorty Gordon

Angels DON'T SHOOT GUNS

By Captain Bernard W. Crandell

Hq. Eighth Bomber Command

THIS is meant to be a story on the toughest gun position in a Flying Fortress but if it incidentally deals with the toughest little gunner ever to lay into a pair of cold blue fifties you may conclude that it takes a lot of both—metal and man—to do the right kind of a job on enemy fighters.

The Fortress can be most any one, just so long as it's heading out over the English coast toward the war mills of Europe with a bay full of bombs and belts choked with bullets.

The gunner, however, will be Shorty Gordon, who operates from a ball turret as round as the oranges that grow back home on his mother's San Fernando ranch.

At the pay table the signature behind the $172.80 is Staff Sergeant Lee C. Gordon, but when he's hanging up there under the belly of a Fort 20,000 feet above Germany, switching his long-barreled fifties at the buzzing Focke-Wulfs and Messerschmitts like a cow bothered by flies, he's plain Shorty Gordon, a hell of a good gunner.

When he's not flying he's talking about it so, figuratively at least, Shorty Gordon lives in that ball turret.

Two-thirds of his turret projects from the bottom of the B-17 to meet attacks from below. In it are two .50 caliber machine guns, several hundred rounds of ammunition, a range mechanism, gun sight, switches, buttons, pedals and petcocks. The gunner gets what room there is left, squeezing in between the guns, legs thrown forward, left foot on the range pedal and right foot on the interphone switch. His knees rest so close to the bolt mechanisms their action during combat often tears his clothes. Remarkable as this strictly G. I. invention may be, it is not nearly so popular in a particular Fortress squadron in England as the 20-year-old kid who operates it.

For Shorty hasn't missed a mission yet.

His feet have been frozen and his electrically-heated baby blue jumper has failed him at 45 degrees below zero.

He has had to work all night inside the wing of a Fortress and go up to fight the Luftwaffe the following day.

He has had to beg, wheedle or steal his way to a gun position in another ship when his own was out of commission.

He has worked on frozen guns at 24,000 feet while fighters were boring in and flesh was tearing off his fingers each time he touched his guns to coax them back into action.

But he hasn't missed a mission yet.

Before Shorty's virtues get out of proportion, let it be said that Shorty is no angel. Because angels don't get drunk and angels don't say "I'm the best damn gunner in this group" and angels don't land in the guardhouse and angels don't gamble or bootleg. And angels, as we all know, don't shoot guns.

Shorty, you see, may be short but he ain't sweet. To be exact, he is 5 feet 2 inches short which—believe it or not, you Air Force experts—might be a bit too small. Most gunners find a ball turret like a straightjacket, but Shorty slips in easily. In fact, he claims he's the only gunner this side of the Atlantic who can wear a parachute inside the turret. He needs a chute to fill up space. When he doesn't wear one he uses a pillow to prop himself up to the sights.

Shorty's pals get a laugh over those pillows. He's always had to use them for one thing or another. Back in the United States, at their base in the desert, a 1931 Chevvy came tooting home to them every night. On the rear seat rested the inevitable case of beer, and on the front would be Shorty, a ridiculous figure propped high on pillows peering over the edge of the windshield.

Shorty still prefers his pillows to a parachute—if the mission looks easy.

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

PREPARING properly for a five-hour ride in an unheated ball turret, exposed to the full blast of the slipstream, is as important as having clean guns. For if the gunner can't take the cold, the Fortress might as well have stayed home.

What does Shorty Gordon wear on a mission? We'll start him right from scratch, from a warm G. I. cot at 0430 o'clock on a cold winter morning.

First, Shorty, you'll get dressed. Step into that clean woolen underwear and clean woolen socks and be sure they're clean because if they're not moisture will collect and freeze. Now pull on your electric suit, that one you call your "zupe suit" just because it has zippers. And the electric shoes and gloves. Next is your cotton gabardine summer flying suit, and a thin leather jacket over that. You wear RAF flying boots because they're higher than your own G. I.'s and they keep the wind—that 45-below-zero wind you found over Wilhelmshaven—off your legs. A white scarf of parachute silk to keep the heat down in your suit, and your leather helmet, and you're ready to go.

You've had a pass at the chow line now, Shorty, and here is the briefing. St. Nazaire, the U-boat base on the French coast, is your target. You know all about this one. It's the one you all say is the toughest in Europe. You've been there before. You know the story from here, Shorty, you tell it.

"I've had to clean my guns and check the turret before we take off," Shorty Gordon begins.

"When the ship gets off the ground I climb into the turret from the inside. On

take-offs and landings I'm not in the turret because if we crash-landed the turret would be smashed. First thing I do is snap on the power switch, then get the guns charged. I have to charge them before we get too high because pulling back those bolts with both hands leaves me a tired guy at high altitude. When we get to the Channel I test the guns by firing a few rounds.

"The guns are pointed downward when I first climb in, but over enemy territory they are forward and low and I'm searching for enemy aircraft. If I'm in the lead ship I search to the front. Otherwise, I search to the front and side of the formation on which we're flying. If I'm in the rear element I concentrate against a rear attack.

"When the turret revolves gunners usually lose all sense of direction because they can't see the bottom of the plane unless the guns are pointing straight to the front or straight to the rear. Some of us veteran gunners can tell just what position our turret is in by the screaming of the wind. It makes different noises as the gun barrels turn in different angles. It increases in volume when the guns are pointing forward and decreases as they swing to the rear.

"As we approach the target I have to hold one hand over an earphone to be sure of hearing the others calling out the direction of attacks by enemy fighters. The wind up there is pretty bad. Besides being way below zero it makes so much noise that when my guns are firing all I can hear is 'put, put, put', and the clicking of the bolts as they go back and forth.

"When the bomb doors open I point the guns down to keep off any oil or dirt that might fly out of the bomb bay. If oil covers the sight plate I can't see to aim. I watch closely now for enemy fighters because this is a favorite time to attack.

It takes a tough guy like Shorty Gordon to handle the toughest gun position in a bomber over Europe.

"If I see one coming from behind the bomb bay doors I shoot right through them. It's either do that or let him get us. There is a catch on the turret that keeps the guns from swinging up and firing into the props or wings, although there have been times when our bullets have accidentally struck other planes in the formation. Luckily they caused little damage.

"When I hear 'bombs away' from the bombardier, I try to watch them falling so I can report to the Intelligence officer where they hit. On this St. Nazaire raid I watched our bombs go down until I lost them. You can't follow them all the way down when you're flying at 25,000 feet, but I estimated their direction and the time they should hit. Other bombs were hitting in the water near the target. Then I saw our first one in the water short of the target. The next one was closer, the third hit the corner of the target and the other two went right into the middle of it. There was a hell of an explosion and we found out later that we made a direct hit on a torpedo storage shed.

"There was so much flak as we approached the target that all I could see ahead was the barrage over the target, a great black cloud that hid the formation of Forts flying ahead. It was like a big thundercloud, thick enough to walk on. We all agreed later that it was the largest and most accurate barrage ever thrown up at the Forts over Europe. The barrage is a swell sight but it gets on my nerves. I could hear flak hitting the ship.

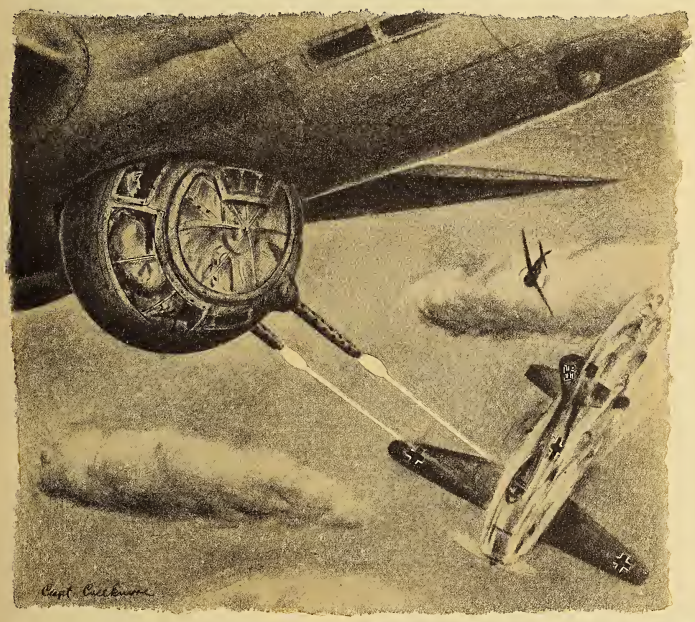
"I knew that if flak hit me while looking down I'd get it in the face, so I continued searching forward. About that time I heard someone on the interphone yell 'I'm hit,' and then another say 'I'm hit.' I thought this time we were going down in France. Everyone seemed to be shot up badly so I waited for the order to bail out. This was one mission I was wearing my chute.

"I was still searching forward when I saw the Number 1 engine on fire. I stepped on the interphone button but it was dead. I wanted to tell my pilot, Lieutenant Cunningham, about it, and wondered if I shouldn't get up into the ship and tell him. It was burning on the under side and he couldn't see it. I decided to stick in the turret because there might be more fighters coming. Finally Lieutenant Cunningham saw the fire through a flak hole in the wing and pulled the fire extinguisher on that engine. That stopped the fire, but the prop was windmilling out of control and I was afraid it would tear off the engine.

"We were over water on the way back when I suddenly remembered that I didn't have my Mae West and was trying to figure out how I could get ashore after hitting the water. But then I heard someone say that enemy fighters were approaching from 11 o'clock. I ran my guns to that position, nearly straight ahead, and waited. I could hear bullets hit our ship but I couldn't see the fighters. That's one of the worst things that can happen—hearing other gunners firing but not being able to help them.

"I heard the bombardier calling out two enemy aircraft coming in low from 3 o'clock. I turned and saw them and gave the first one a long burst at 800 yards. They were Focke-Wulf 190s and one was following the other. I hit the first one. Both of them saw my tracers and started to break off. Then I gave the first one another good burst at about 600 yards and saw my tracers going into his engine. He caught fire and went into a dive. I followed him for about 5,000 feet, then started searching for the other fighter. One of the waist gunners saw the first FW splash in the water. It was easy to see because we were only at 15,000 feet. The other fighter apparently turned back.

"My feet started to hurt pretty bad when we got down to 10,000 feet because they began thawing out. I had to take off my helmet and tear at my hair to keep from feeling the pain. My electric shoes hadn't been working. That was the fifth time I froze my feet. When I search forward my feet and legs are pointing ahead, and that makes the blood run back out of them."



"He caught fire and went into a dive. One of the gunners saw him splash into the water."

For two weeks after that mission Shorty's feet bothered him. It wasn't their feeling numb and going to sleep all the time that worried him; he was just afraid they

wouldn't let him go up again in that condition. That fear of being left behind is one of Shorty's continual worries and it has been ever since his crew was broken up in the States just before the air echelon flew to England.

Shorty had to come over by boat. That boat ride mortified him—the best gunner in the group having to travel by boat. Back at Muroc he had been telling the boys in the barracks that he was going to be in the "Big Push," and a boat ride was an inglorious start to Shorty's personal invasion of Europe.

But Shorty was in a new crew before the group went out on its first mission. And he had happy hunting for a while. But the fifth time "Cunningham's Coffin" thundered back from the Continent it was in a state of salvage even before it landed. Normally, a crew waits until its Fortress is replaced. But Shorty couldn't wait.

He started bumming rides on other B-17s. Any old Fort would do, and if the ball turret weren't open for him, why, he'd take the tail gun. Yes sir, any old gun position would do. Even a waist gun. And if no position were open, Shorty would try to sell some other gunner the idea of letting him take his place.

From "Cunningham's Coffin" Shorty went to the famous "Boom Town." Then to "Little Joe," and then the "Sunrise Serenader," the Fort that came home from the second raid on Germany with one wing dangling from a direct hit by a 20 mm. explosive shell in the main spar. Shorty was scared that time. He might have been tired, too . . .

He had returned to the station from a 48-hour pass on the afternoon before the raid. He had had little sleep. He went to his ship, spent two hours cleaning his guns, and was about to hit his bunk when the engineering officer called for him. A supercharger needed changing on one of the Forts, and Shorty was the only man small enough to climb inside the wing and crawl out to the engine and do the job.

Shorty worked most of the night inside the wing of that B-17. In there between the spars, compressed, cold. But working. He was finished at 0400 o'clock. Just enough time for breakfast. Then the briefing.

He was tail gunner on that trip and his guns froze up over the North Sea on the way in. That was the day the mercury at 22,000 feet was 45 below. That was the time he took off his electric gloves to work on his guns. The waist gunners could see Shorty back in the tail, bent over his frozen fifties, but they couldn't see what the metal was doing to his hands. Every time the moist side surfaces of his fingers touched the barrels, skin was welded to steel. And when Shorty pulled his hands away, the steel didn't rip an inch.

"I won't be able to use these guns, Lieutenant," Shorty called over the interphone. "But I'll sit back here and tell the boys where the fighters are coming from."

That day Shorty became a broadcaster.

He gave a play-by-play description of the longest battle the Forts ever had over Europe. He had no sooner announced his broadcasting intentions when . . .

WHAM! It was a concentrated attack by FW-190s, ME-109s, 110s, 210s and even JU-88s. In they came and Shorty was on the air, warming to his job like a professional when the horses are heading for the wire. He was slightly excited at the time, he admitted later. In fact, he became unintelligible in spots and the other gunners couldn't quite follow his dazzling description of the 75-minute battle up there in the cold blue sky between the Forts and the Luftwaffe. They tried to tell him to get the hell off the air but his interphone switch was locked in position, the fight was just beginning, and Shorty was already heading for the wire.

Shorty saw everything that day. He saw things happen that had never happened before. He saw a Fortress drop out of formation with four Focke-Wulfs after it. The Fort took violent evasive action. It swung up and over, into a complete barrel roll. Fighters do that; not Fortresses. It took Shorty several minutes to get his voice down to a scream and describe it.

A few minutes later an FW collided with a Fortress head-on.

"The Focke-Wulf was starting to roll over and go into the usual dive away from our formation when his wing hit the wing of a ship in the element below us," Shorty recalls. "The impact cut the wing off the fighter and knocked the wing off the Fortress just past its Number 4 engine. The Fort started into a circle, then went into a tight spin. It broke in two right at the middle and the ball turret went spinning down looking like a baby's rattle. Then the wreckage exploded."

Returning across the North Sea, Shorty's ship had dropped back to protect a Fort limping along on three engines when a Focke-Wulf landed the cannon shell that nearly tore off the wing. They got the fighter that did it, and they eventually landed safely although the "Sunrise Serenader" was such a mess it couldn't be taxied off the runway.

Some of the things that Shorty does are not good examples for prospective gunners. They're not meant to be. Shorty at times is a horrible example. But most of the time a horribly good one. And everyone loves him for it. He's the one big factor in Squadron morale, with all his worrying about going on missions, and his extra-curricular activities. . . .

It was after that eventful raid on Germany that other gunners down in the tin Nissen hut paused between deals to ask Shorty if the "Big Push" finally was on. They had waited months to hear it, and were so amused when Shorty said "yes", it was an easy moment for him to finger out the card he needed for 21.

Shorty never is lucky at cards although he gives them all the charm he can muster. Even his "Salt Mine" doesn't help very much. A gunner's "Salt Mine"—in Shorty's squadron at least—is any special article that brings luck to his cards. Shorty's once was a dilapidated, dirty old mechanic's cap with long strings that hung down in his face. This eyesore was what he wore to bring luck at Black Jack. But he found he couldn't rely on it. It lost him too much money. So now the tattered cap has been replaced by a new Salt Mine, a cat that hangs around the hut in the evenings. With the cat on his lap Shorty seems to do better, although even the new Salt Mine gets kicked out of the place occasionally.

The other gunners view Shorty as a combination comic strip—Katzenjammer kid one minute, a Superman the next. They tell of the time their squadron commander inspected the barracks, walking right past a bed with blankets neatly drawn up and looking like any other bed—except for a slight hump in the center 5 feet 2 inches long. That's one of the Gordon tricks.

On the dance floor, Shorty's number fours can burn more timber than a forest fire. At one of the squadron dances he entered the jitterbug contest. His partner, a WAAF, couldn't stand the pace and gave up after the first thirty minutes, but Shorty was just getting his second wind. He went on jitterbugging by himself to win first prize. It turned out to be a fancy toilet kit.

Shorty has a girl, too. Two inches shorter than he is. And he wants to get married. Shorty has known her for three months now and would have married her before this but didn't want to "just jump into something". Army regulations here say you can't marry until you have officially stated your intentions, then waited two months. Shorty thinks he'll file his intentions any time now so those two months will be up at the same time he has completed 25 combat missions and can go off operations.

Shorty had a time convincing his fiancee's parents that he was not an ordinary Yank, the type about whom they had heard *stories*.

"But I began playing darts with her old man, drank 10 quarts of his beer and we got along fine," Shorty explained. "And her mother wept when she heard I was going out on combat."

Combat is the one thing he wouldn't be without. He'll take a good fight any time he can get it, and the best ones always are those above 20,000 feet where you're matching bullets with men who fly behind black-and-white crosses. They're grudge and blood fights because every man up there has had friends who never came back. Shorty is no exception. He hates their guts. He came face to face with a Jerry once. . . .

It was on the Romilly raid. An aircraft repair depot at Romilly-sur-Seine was the target.

Shorty nearly didn't make it. He couldn't get one of his guns together and the pilot was standing there beside him saying he was afraid they wouldn't be able to go if all the guns weren't functioning. But Shorty pleaded.

"Now, Lieutenant," he argued as he sweated over the *(Continued on Page 38)*

HIGH LEVEL JUMPING

Free fall, oxygen equipment, loss of consciousness, and other factors in parachuting from altitude.

The following article was compiled from information furnished by the Office of the Air Surgeon, at Headquarters, and the Materiel Center, at Wright Field.—ED.

ONE of the Air Forces' oldest "auxiliary" fraternities—older than the Short-Snorters, the Burma Roadsters and other "Orders" of the day—is the Caterpillar Club.

Its membership, somewhat exclusive in the days when planes still drew curious glances skyward, has mounted by leaps and bounds since the exigencies of war have forced more and more airmen to hit the silk.

There was a time when the average initiate into the club underwent a routine induction somewhat as follows: Something went wrong with the ship in flight. The pilot caressed his chute, muttered a prayer, bailed out, pulled the rip cord, hit the ground, sighed with relief. He was in.

This procedure still prevails, perhaps in the majority of cases, but nowadays a prospective Caterpillar must face other factors.

For instance, there's that tendency in this war to leave yourself open to a little target practice when you are so unfortunate as to be forced to abandon your plane.

In such cases, the boys who have any desire to enjoy their membership in the Caterpillar Club have learned to keep their hands off the rip cord until the last minute in order to make themselves a more elusive bullseye.

Another important element affecting parachute escape has been the development of high-altitude flying.

Many things happen to an airplane flying at high altitudes in wartime which compel the flyer to abandon his ship. Fire, a crumpled wing, or severe damage by enemy gunfire may cause an immediate necessity for bailing out, without allowing time for diving the plane to lower altitudes. Frequently, any attempt to lose altitude before abandoning a plane will result in structural collapse, complete loss of control and an added difficulty of escape.

From an altitude of 30,000 feet a flyer can open his parachute immediately without experiencing loss of consciousness or any other extremely ill effects during descent. But a bail-out without oxygen equipment much above this level, or without resort to other safeguards, result in more than a few unpleasantries.

By way of background, the average rate of fall at 30,000 feet with open chute is 32.6 feet per second; at 20,000 feet, 27.4 feet per second; at 10,000 feet, 23.2 feet per second, and at ground level, 20 feet per second. The rate of fall increases comparably to 40.4 feet per second at 40,000 feet.

However, without emergency oxygen equipment, an airman bailing out will have useful periods of consciousness of from one to one and a half minutes at 30,000 feet, about thirty to forty seconds at 35,000 feet, and only about fifteen seconds at 40,000 feet.

Obviously, then, he will reach sufficiently dense air in time to avoid ill results from the 30,000-foot level with open chute, but not from much greater altitudes.

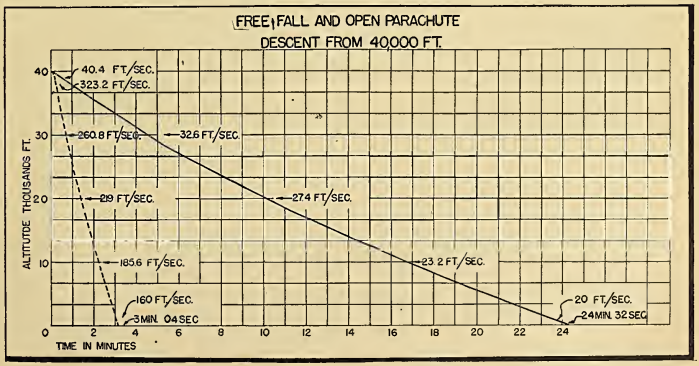
Fortunately, with the raising of aircraft ceilings, experimental engineers are devising equipment to take care of personnel at higher altitudes not only while they are in aircraft but when they are forced in emergencies to bail out.

A small oxygen cylinder—known as the bail-out bottle—has been designed to be carried in the pockets or strapped to the legs of high-altitude flyers. Oxygen is breathed through a pipe-stem. An eight-minute supply is available—sufficient to permit safe descent from any altitude in an open parachute without loss of consciousness.

EVEN the use of the bail-out bottle has its disadvantages, however, not the least of which is the necessity for the removal of the oxygen mask in order to place the bottle pipe-stem between the teeth. The protection from the extreme cold afforded by the mask is thus lost and the flyer's face is exposed to possible freezing during descent through the upper atmosphere. There are other shortcomings, but the bail-out bottle represents a decided step toward the solution of the problem.

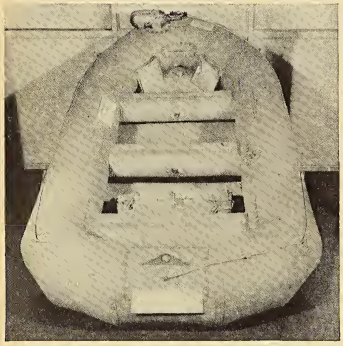
In multiplace aircraft, such as a bomber, the walk-around bottle as well as the bail-out bottle is usually *(Continued on Page 33)*

This figure shows the comparative rates of "free fall" and descent by parachute from an altitude of 40,000 feet.



TECHNIQUE

A MONTHLY REVIEW OF TECHNICAL DEVELOPMENTS IN THE AIR FORCES



The seven-man E-2 life raft pictured above has been adopted by the Army Air Forces for use on big planes.

Seven-Man Life Raft

In the collegiate Ford there was always room for one more and now a new life raft offers room for at least two more than usual with official adoption by the AAF of the E-2 model, a seven-man raft which is now standard equipment for our big planes.

Also ready and approved is an improved version of the five-man life raft, the A-3, just like the E-2 in every respect except size, for use with the Army's current production planes.

When the rafts were redesigned last year, increased comfort was the primary objective. This has been achieved in the E-2 and A-3. But you can't limit the number of occupants in an emergency so if it is necessary for twelve men to board a seven-man raft, it will hold them but with a consequent decrease in personal comfort.

Both of the new models come from the Equipment Laboratory at Wright Field and are equipped with more and better accessories.

Believed by AAF experts to be the finest raft of its kind, the E-2 has a 2,500 pound capacity and weighs 106 pounds with complete equipment. It fits into a carrying case 20 inches in diameter and 36 inches long. Both new models are made of a rubberized fabric that is more effective than the old rubber bladders and requires much less rubber. When inflated the E-2 is twelve feet long and five feet eight inches wide. By means of a compartment-type inflation device located in the bow of the boat, the raft can be inflated in from twenty to thirty seconds.

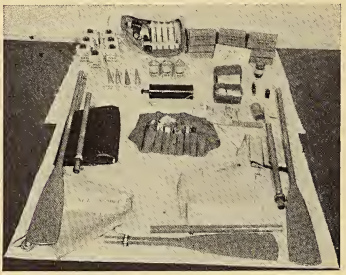
Horizontal instead of vertical bulkheads have been built into the new models. Here's what this means:

The chief disadvantage of the vertical bulkhead was that when one side of the supporting tube was punctured by gunfire from a strafing enemy craft or by the attack of a shark the entire side collapsed, dropping the occupants of the raft into the water with only the one remaining side-tube to cling to for support.

Horizontal bulkheads are a definite improvement. With either the top or bottom of the supporting tube punctured, the remaining top or bottom side can adequately keep the raft afloat and upright. So long as the entire raft is not completely riddled it will retain its boat shape and buoyancy.

The five-man raft (A-3) is a 1,000 pound capacity raft. Like the E-2 it is made of rubberized fabric, contains horizontal bulkheads, lowered seats, more room, a mast and sail for improved navigation. It is 110 inches long and 60 inches wide, weighs 93 pounds with complete accessories, and can be rolled into a bundle 18 by 36 inches when deflated. Its accessories are the same as for the E-2.

The radio transmitter described in AIR FORCE (April) is standard equipment for both models.



The accessories shown above are standard equipment for the E-2 and A-3 life rafts.

These multi-place life rafts have almost enough accessories to open a general store. In addition to the radio transmitter, the following are standard equipment at time of writing on both the E-2 and A-3 models: hand pump with hose to maintain inflation of raft, repair kit, 75 pound test cotton cord for utility use and to lash accessories to raft, sea anchor, pyrotechnic pistol and five distress signals, emergency drinking water, a yellowish green sea marker dye to color water around raft to attract rescuers, type "K" rations, floating type flashlight, scout knife, police whistle to signal in fog, first aid kit, emergency fishing kit, paulin for use as sail, another paulin for catching rain water or for use as a signal, shade or camouflage, oars, bailing bucket, bullet-hole plugs, combination compass and match container.

—Wright Field.

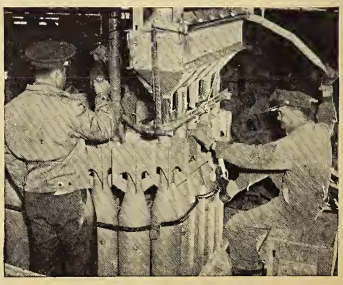
P-38 Ladder

A light, portable ladder which is attached to the stirrup of a P-38 to facilitate workers in going up on the planes is the design of Orval W. Meth (above), aircraft electrician in the engineering shops at the Sacramento Air Depot's McClellan Field, California.

Bomb Bottler

Five at a time, 100-pound practice bombs are each filled with 90 pounds of hot, dry sand and made ready for the powder charge by a "bomb bottling" machine (below) developed at the San Angelo, Texas, Army Air Field. The machine does the work of 10 three-man teams of soldiers releasing them for more skilled aviation work or combat duty.

Resembling a giant soda pop bottling machine, the "bomb bottler" is preparing thousands of practice bombs daily for bom-



bardier cadets. Developed by aviation ordnance engineers, the loading machine accomplishes the first in a series of steps which prepare a 100-pound practice bomb, made up of 90 pounds of sand, five pounds of spotting powder and five pounds of shell and fins. Loaded with sand and powder charge it is for all practice purposes identical to the 100-pound bombs used in combat.

The job of the bomb-loading machine is to fill the practice "eggs" with the precise amount of clean, dry sand so that each will weigh the same. Accuracy in this operation is mandatory since wind resistance and trajectory of the falling missile may be altered by a slight variation in weight.

At the bomb plant siding carloads of bank-run sand are dumped. The sand then moves along an endless belt conveyer to a hopper and on into a revolving horizontal cylinder where it is cooked under several thousand degrees of heat until the last drop of moisture is gone. The sand then goes to a four-ton hopper to be screened of each stick or stone which might alter the weight of the bomb load.

Beneath the hopper is the "bomb bottler" which fills five bombs at one pull of the lever. A turntable affair with four sides, the machine fills one set while others are being readied, capped and unloaded.

An ordnance inspector checks each bomb, sends back those which need correction. A five-pound capsule of spotting powder is then inserted and the bomb is ready for the flight line.—**Public Relations Office, San Angelo Army Air Field, Texas.**

Glider Trailers

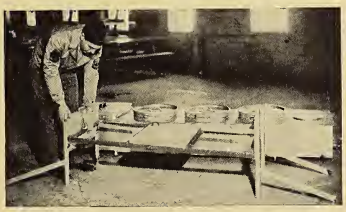
Huge trailers for the ground transportation of gliders are being used at Wright Field on an experimental basis. The trailers, which loaded can be hauled by a one and one-half ton tractor, were developed by the Glider Unit under the direction of Colonel F. R. Dent and are designed to transport either wings or fuselages. Two trailers can carry one complete glider. Originally of all metal construction, later models are of wood. In the picture above: left, the newer all-wood type; center, the all-metal, and right, a glider repair shop truck.—**Wright Field.**

Portable Steam Table

A portable steam table suitable for field duty is the handiwork of Technical Sergeant Lauren N. Elkins, a mess sergeant at the Rome Air Depot, New York. Approximately 300 men can be fed keeping the food hot for an indefinite period.

It utilizes two gas units from army field ranges and has a 15-gallon coffee unit, with a convenient spigot. Food can be heated by placing it from the can into the steam table and letting the steam do the work. In combat it can also be employed to sterilize water. The center space between the gas units gives room for two tool kits.

Technical Sergeant Elkins and steam table. Below, dismantled for shipping.



The steam table can be dismantled for shipping in 28 seconds. It fits into a box which can be converted into two tables and two benches. One table and the benches form the officers mess, the other is utilized as a cook's work table.

Turns Tables on Turnbuckles

A thin piece of spring steel one-half inch wide and five inches long which may eliminate the necessity of adjusting turnbuckles on control cables of aircraft is the contribution of Master Sergeant Stanley Billet of Minter Field.

Turnbuckles are now checked every 100 hours because should they become loose a slack would develop in the control cables. But with Master Sergeant Billet's gadget—a spring steel lock plate and fastener pin which turned the cable-loosening forces against each other—the turnbuckle is held permanently in place.—**Public Relations Office, Minter Field, California.**

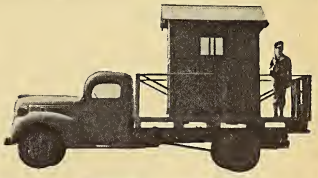
Umbrellas For Mechanics

Maintenance crews in desert and tropical areas will soon carry their own beach umbrellas. The sun shades, however, are not designed for languorous tropical lounging but rather to protect Army Air Forces mechs from the burning and exhaustive rays of the desert sun, enabling them to work longer and more efficiently.

Two types of umbrellas have been developed by the Miscellaneous Equipment Laboratory at Wright Field. One can be attached to the portable adjustable maintenance stand. The other has a standard with a spike which can be driven into the ground; heavy cord fastened to the plane helps support the umbrella.

The umbrellas not only aid the crews but also serve to shade aircraft and parts which frequently need cooling after exposure to the sun's rays.—**Wright Field.**

(Technique Continued)



Portable Sentry Box

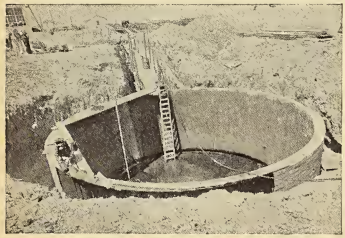
Adapting one and a half ton Dodge chassis to specific purposes is a feature of the Automotive Department under Major William V. Garretson at the Newark Army Air Base. Shown above is a portable regulation sentry box on a platform completely surrounded with a safety railing. The sentry has excellent visibility from this elevated post.—**Captain Arthur J. Lonergan, Newark Army Air Base, New Jersey.**

Concrete Gas Tanks

A new gasoline storage tank constructed almost entirely of concrete at Lowry Field, Colorado, seems to answer the need for more gas storage facilities and the conservation of vital steel.

Six months of experimental operation has demonstrated that concrete tanks can do the job as well as steel and just as cheaply.

The project, conceived and carried out by Major Karl Weinand, Area Engineer, required only a ton of steel and it was used only for concrete re-inforcement. The tank measures 30 feet in diameter and 12 in depth and has a capacity of 50,000 gallons of 100 octane gasoline.



Gasoline concrete storage tank is shown above in early stages of construction.

The danger of leaks caused by cracks in the settling concrete was eliminated by specifying double walls separated by a water jacket. The inner wall is eight inches thick, the outer wall 12 inches, and they are separated by a five inch space filled with water. Should the inner wall spring a leak the water pressure would prevent gasoline from escaping. To complete the leak-proofing the floor is laminated and consists of 12 inches of concrete, a heavy layer of mastic and then eight more inches of concrete.

The inside walls were treated with carbon dioxide to remove any free lime that might have remained in the pores, thus eliminating the only known possibility of chemical reaction between the walls and the gasoline. Regular checks have substantiated Major Weinand's belief that the concrete would not disintegrate or break down in any way from prolonged contact with the highly volatile fuel.

The tank is equipped with a mechanical system which utilizes a pair of coupled, synchronized pumps, one handling water and the other gasoline, commonly called the Aqua System. As gasoline is pumped out of the top of the tank, water is pumped in at the bottom so that the tank is always full of liquid and there is no opportunity for explosive fumes to form in the dome. When gas is pumped into the tank the procedure is reversed.

As the water level rises and the gas supply becomes low, a pair of Clayton No. 124 automatic float valves, hydraulically controlled, shuts off both pumps while there is still 18 inches of gasoline in the tank. Thus, no water can be pumped into the trucks which service the planes.

Operation of the tank is carried out from a small control house where pumps and switches are located. The installation uses Wayne Model 569 priming and air eliminating pumps powered by five-horsepower explosion-proof, three-phase electric motors capable of delivering 200 gallons per minute. All electrical connections and switches are spark-proof and electric light bulbs are equipped with vapor locks out of respect to the extremely high volatility of aviation gasoline. The whole installation is now operated by personnel of the 59th Sub-Depot at Lowry Field.—**Captain Robert W. Ray, 59th Sub-Depot, Lowry Field, Colorado.**

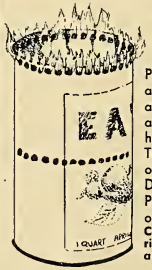
Two New Protractors

Two time-saving proctractors for measuring the degrees of "travel" of ailerons, flaps, elevators, trim tabs and rudders have been perfected by H. L. Blakley, 29th Sub-Depot aircraft inspector, and put to practical use at the Enid Army Flying School, Oklahoma.

The protractors not only speed alignment of movable parts but eliminate errors in calculation.

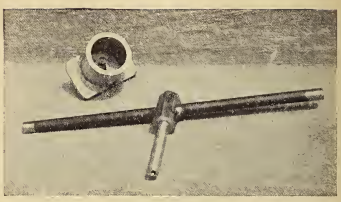
Formerly the required "travel" of ailerons, flaps, elevators and trim tabs was measured by means of a comparatively complicated protractor and an ordinary ruler which did not offer direct readings and could not be used on the underside of moving parts. With the Blakley protractor, direct readings can be taken either erect or upside down. It is produced at low cost at the Sub-Depot shops and it is now possible to supply each mechanic with his own instrument.

His other protractor computes the "travel" of rudders. Constructed entirely of plywood it also can be produced at low cost.—**29th Sub-Depot, Enid, Oklahoma.**



Tin Can Emergency Stove

Remove top of can. Punch holes completely around top rim. Punch another row halfway around at middle. Fill half full with gasoline. Turn side with mid-row of holes away from wind. Drop a match into can. Place vessel to be heated on top.— **Developed by Captain John How, Morrison Field, Florida, from an idea by Akel Wickfeld.**



Keeping Hot Pilots Hot

A simple device contrived by Staff Sergeant Frank E. Sugg at Hendricks Field, Florida, has cut untold hours from the maintenance time on B-17s. His invention of a glycol boiler "core puller" (above) has drawn immediate approval and is being manufactured for use at Hendricks.

When the B-17 on bombing missions flies for long periods at sub-zero altitudes it's important that the heating system for the cabin be operating properly. Briefly, the system works like this: glycol is pumped through a tubing circuit, gaining heat as it circulates about individual cores of three boiler units housed in an exhaust pipe and then passing on to the main heating outlet in the cabin. But glycol tends to carbonize on these cores causing proportionate loss of heat output until the system ultimately becomes ineffective. At this point the cores must come out and this is where Staff Sergeant Sugg's "core puller" comes in.

Previously extracting a core from its boiler meant removing the boiler first, actually the toughest part of the whole procedure. By the time all three cores had been taken out and cleaned and the boiler bolted back in place, a full day had usually slipped by.

Staff Sergeant Sugg, now a crew chief of a B-17 at Lockbourne Army Air Base, Ohio, subsequently fashioned a "glycol flushing system" which cleans the entire system and reduces to a great extent the chances for carbonization.—**Private Richard Eckman in the Hendricks Field Hi-Life.**

Synthetic Airplane Tires

After service-testing approximately 4,000 synthetic airplane tires, the Army Air Forces Materiel Center at Wright Field, Ohio, reports that synthetic tires are equal to, or may be superior to, natural rubber tires.

Natural rubber tires, however, are more adaptable to use in either extreme heat or cold; synthetic tires are not yet adaptable to both Arctic and tropical weather conditions. One synthetic process can make tires for use in extreme cold, while another process adapts tires for use in extreme heat. But as yet no process has been developed to make a synthetic tire suitable for both weather extremes. **—Wright Field, Ohio.**

What's your AIR FORCE I.Q.?

Grab the controls and take off on another flight with the Air Force Quiz of the month. Be light on the stick and watch out for a cross wind while landing. If your score is 100, you're perfect, as usual; 80 to 95, you're on the beam; 65 to 75, you're getting off course; 60 or below, you'd better check your bearings. Answers on Page 32.

1. *Anoxia is caused by*

o. High speeds
b. Insufficiency of oxygen
c. Rough weather
d. Bod diet

2. *An object can best be seen in very dim light by looking*

o. Directly ot it
b. To one side of it
c. Steodily ot it ond blinking ot four-second intervols
d. Steodily ot it ond blinking ot eight-second intervols

3. *When marching at quick time, the length of the step should be*

o. 24 inches
b. 30 inches
c. 36 inches
d. 40 inches

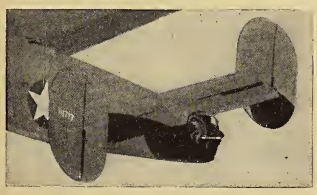
4. *A Thunderhead is a*

o. Pilot who loses his temper easily
b. "Dressing down" by the C.O.
c. B-24
d. Cloud formotion

5. *Randolph Field is now*

o. An induction center
b. A preflight school
c. A bosic troining school
d. A centrol instructors' school

6. *Identify this plane:*



7. *Which of these words is inappropriate in this grouping?*

o. Altimeter
b. Micrometer
c. Bonk indicotor
d. Tochometer

8. *When rendering a hand salute properly, the forearm is inclined at an angle of*

a. 25 degrees
b. 30 degrees
c. 45 degrees
d. 65 degrees

9. *The props of an A-20 rotate in opposite directions*

o. True
b. Folse

10. *Arterial bleeding is indicated when the blood flow*

o. Is o slow steody streom; dork red or purple
b. Is oozing
c. Spurts; bright red in color

11. *In a P-39 Airacobra, the pilot sits*

o. In front of the engine
b. Behind the engine
c. Over the engine
d. Beside the engine

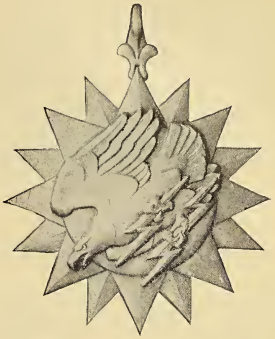
12. *The maximum amount of National Service Life Insurance available to an enlisted man is*

o. $3,000
b. $5,000
c. $10,000
d. $15,000

13. *The translation of the Technical Training Command's motto, "Sustineo Alas", means*

a. I sustoin mointenonce stondords
b. I succeed in flight
c. Sustoined combot will win
d. I sustoin the wings

14. *Identify this medal:*



15. *The official colors of the Army Air Forces are*

a. Cobolt blue piped with golden yellow
b. Dork blue piped with light blue
c. Dork blue piped with white
d. Ultromorine blue piped with golden oronge

16. *The props of a P-38 rotate in the same direction*

a. True
b. Folse

17. *Your map is said to be "Oriented" when the north arrow on the map points*

o. To the Orient
b. North on the ground
c. In the direction you wont to trovel
d. Eost to the rising sun

18. *What do the following abbreviations stand for?*

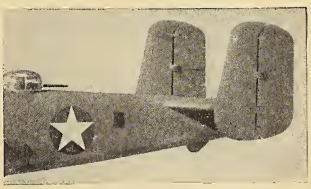
(one wrong is all wrong)

o. CQ
b. APO
c. BOQ
d. OCS

19. *The word Azimuth is associated with a*

o. Rheostot
b. Altimeter
c. Compass
d. Oxygen mosk

20. *Identify this plane:*



A cargo plane awaits a takeoff at one of the outlying airports along the Trans-African run.

IF YOU'RE GOING TO MID-AFRICA-

By Major Stephen L. Gumport
FLIGHT SURGEON

The author gets a close-up of an all-purpose camel near an East African air transport base.

Above are typical houseboys hired by officers on the Gold Coast; the music comes with the boy. Below is one of the marketplaces near a base "somewhere on the African front".

BEING a doctor, I did not have to overtax my imagination to visualize the possible obstacles to be encountered in central and western Africa—ranging from jungle animals and snakes to sleeping sickness, leprosy and malaria. However, 24 hours in which to make all necessary travel arrangements (allotments, power of attorney, car storage, and so forth) and assemble 77 pounds of useful articles does not leave much time for wondering what lay ahead.

Actually, of the 77 pounds of baggage about 25 pounds could well have been dispensed with. Such items as soap, shaving cream, cigarettes and tobacco can be purchased locally at U. S. Army PXs or in stores throughout west Africa and the Anglo-Egyptian Sudan. Post Exchanges are set up along this route and sell standard U. S. toilet articles, insignia, clothing, candy and tobacco and cigarettes (six cents a pack).

Clothing, with the possible exception of a woolen uniform and lined trench coat, should all be washable if you are headed for this territory. Laundry service is easy to obtain but dry-cleaning establishments are much more difficult to locate.

I had expected to find this area of Africa one huge jungle. As a matter of fact, with the exception of Liberia, most of the bases from West Africa to the Sudan are located in open, semi-arid country that greatly resembles parts of Texas. Rain usually comes in one or two relatively concentrated periods during the year, with little or no precipitation during the remainder of the time.

Much to my surprise my blouse, trench coat and other woolens did not mildew even in the most humid places on the coast. Whenever possible, however, I hung them out to air during the day, and at night kept them in a closet lighted by electricity.

The natives throughout this area are friendly and helpful. As traders they know how to drive a hard bargain; about one-half to one-third of the asking price is what they expect to obtain for their wares. As houseboys they are very loyal and hard-working, as long as their employer exercises patience and realizes their limitations.

It is the custom in most fixed camps and bases along the central African route for these natives to do most of the menial work —including laundry, cleaning of barracks and other buildings, shining of insignia and the like. They have been brought up to respect the European and this respect should not be destroyed by over-familiarity, nor should the houseboys be spoiled by over-tipping. Local customs in this regard should be closely adhered to. Even though it might seem too trifling a sum, five shillings (about $1) a week is the standard tip in many places.

Along the west coast, natives speak a pidgin English and have many curious expressions. Some of the more familiar ones are:

"Dash" for tip.

To do something "one time" means right away.

"Go softly" is go slowly.

"Make big breeze" means to go fast.

To do something "proper" means to do it correctly.

"Chop" refers to food and meals (breakfast, lunch or dinner).

NATIVES in the bush-country are hospitable and helpful to pilots forced down, although they sometimes find it hard to believe there actually are men flying in the planes. The natives seem to accept aircraft as man-made birds but it seldom occurs to them that their makers are aboard. I have known of cases, however, where natives braved intense flames to rescue occupants of crashed planes.

Camouflaged planes frequently are difficult to locate if they are forced down in this area. It is always a good idea to open a parachute near the plane so your presence can be detected more easily from the air.

Of the many varied and interesting (to the medical mind) tropical diseases present in this area, there are really only three outstanding ones from the viewpoint of a soldier along the route: (1) malaria, (2) diarrhea and dysentery, and (3) venereal diseases.

Needless to say, such ills as sleeping sickness, leprosy, yaws and the like do exist, but although they are present among the natives, they are a rarity among even those Europeans who have spent years in the area. So from a practical point of view, they do not constitute a hazard to white populations living segregated from the native towns.

But the "Big Three" represent another question. They are decidedly important

Tips on how to make friends and influence people — including yourself — in this section of the dark continent.

factors to be coped with and it is a matter of not only the command but also of each *individual* putting forth efforts along simple and straightforward lines of public health and sanitation. When these efforts are forthcoming, the health—and morale—of commands in these tropical countries is the equal of that any place. But the reverse holds true when lack of interest and negligence prevails. And remember, a soldier can be as thoroughly incapacitated by any of these illnesses as by the enemy's bullets.

A word in brief about these three hazards:

Malaria is transmitted by the female anopheles mosquito. Group control of this disease aims at destroying the breeding places of the mosquito, swamp puddles and all kinds of standing fresh and even brackish water. (Other mosquito-borne diseases such as yellow fever, dengue and filariasis are likewise eliminated at the same time.)

Screening of quarters, netting of beds and spraying of quarters with insecticide should then be done in an effort to wipe out those mosquitoes that have succeeded in breeding out. All these elaborate precautions can be a total waste of time; their success depends on the cooperation of each man in staying in screened quarters after dark as much as possible; seeing that his bed net is kept in good repair and is lowered into place at least two hours before sunset; wearing long-sleeved shirts, long trousers and mosquito boots (high top) after dark; using head nets, gloves and, if possible, chemical repellents when he must be out and standing still (guarding planes); staying out of native towns after dark where infected malaria mosquitoes, not to mention other health risks, abound.

Remember, more than one person has acquired malaria at the same time that he exposed himself to a venereal disease.

The possibility of developing a drug that will actually *prevent* development of malaria is being worked on and may prove one of the greatest possible aids toward opening the tropics to white man. At present, however, most medical men feel that neither quinine nor atabrine when taken regularly in prophylactic doses will prevent a person from developing the disease. These drugs, taken in this manner, very possibly act as "suppressives" and may actually suppress the symptoms while being taken. However, soon after the medicine is stopped the individual may come down with malaria which actually was acquired weeks before. When these drugs are taken for this purpose they should be used regularly as it is not only useless but may actually be dangerous to use them off and on.

It should be borne in mind that the type of malaria (aestivo-autumnal or malignant tertian) most prevalent throughout this area differs greatly from the type of malaria (benign tertian) that occurs in the United States with its severe shaking chills, very high temperature and relatively sudden onset. The malignant tertian type is much more apt to have a quite subtle set of symptoms such as headache, backache, pains in the arms and legs, temperature about 101, and occasionally nausea and vomiting.

THESE symptoms, of course, may occur in a host of other diseases. The only positive proof possible is to find the parasite in a blood smear and see it under a microscope. And this is the way a diagnosis is made. Any person returning from Africa should be certain to tell his physician that he has been exposed to malaria if he is taken ill. Early treatment of this type of malaria is quickly effective. However, delay is very dangerous.

Diarrhea and dysentery in Africa—as in the United States—are transmitted mainly through food, water, milk, food handlers or by flies. At all our Army bases these factors are thoroughly controlled and supervised. But even in "nice" hotels and in the homes of civilians you might visit, the risk is present. Remember to avoid consuming salads or uncooked vegetables, untreated water, fresh milk and raw fruit, except thick-skinned fruit that can be peeled.

Venereal diseases are extremely prevalent throughout this area—and the hazards involved cannot be exaggerated. Enough said.

Various fungus diseases, such as athlete's foot and ringworm, as in all tropical countries, are easily contracted unless care is exercised. Daily showers, followed by thorough drying of the body especially between legs, toes, and so forth, is important. GI foot powder is a great help and should be used freely.

In certain of the drier areas, particularly the Sudan, extra salt should be taken daily in the form of salt tablets (or table salt, if tablets are not available). This helps make up the salt lost in profuse perspiration and prevents many of the milder symptoms caused by heat.

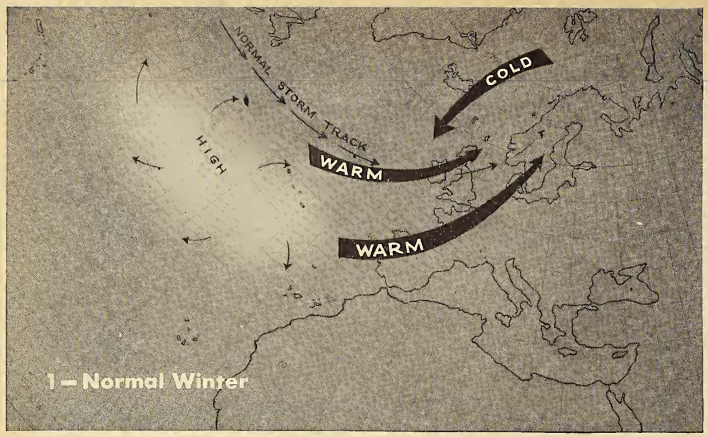
Amusements throughout this area are varied. Along the coast there is excellent swimming and in many places fairly good riding horses can be purchased for as little as $10 apiece. When time permits, personnel may engage in hunting and fishing. Then, too, movies arrive about three times a week by plane from the States. Mail service has been good, letters usually requiring between seven and ten days to go or come.

Most good times are self-made and the happiest individuals in the African tropics, as elsewhere, are those who put out the most work, and then make the most of their free time by following up their interests in sports and other recreations without fretting over things 10,000 miles away about which they can do little or nothing. ☆

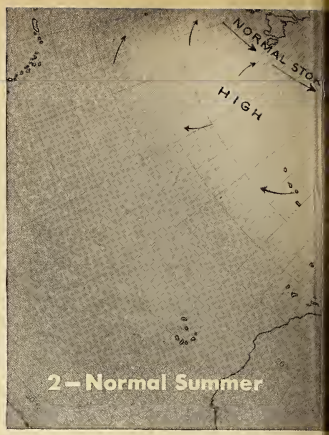
These big fellows are part of a group on guard duty day and night at an African Airfield.

On the edge of an East African airfield appears this cantrast in modes of transportatian.

Never drink water from native wells. This one is within inches of ground level and is the repository of assarted filth. Belaw is the interior of a typical transport on the African run.



1—Normal Winter



2—Normal Summer

EUROPEAN Weather

By Major Joseph J. George

WEATHER INFORMATION SERVICE, HEADQUARTERS, ARMY AIR FORCES

SUMMER weather over England and Western Europe, bringing with it changes in aerial tactics, demands the studied attention of American airmen particularly since it differs a great deal from summer in the United States.

European weather is predominantly marine in origin and character. It moves onto the continent from the ocean without passing over any great mountain barriers—as it does on our own coasts—and thus is little transformed. Europe has lower average temperatures in summer, since the air flow is mainly from the north. Cold fronts are not followed simply by clear skies, as in most of America; passage of a cold front is generally pursued by broken cumulus clouds and showers. ☆

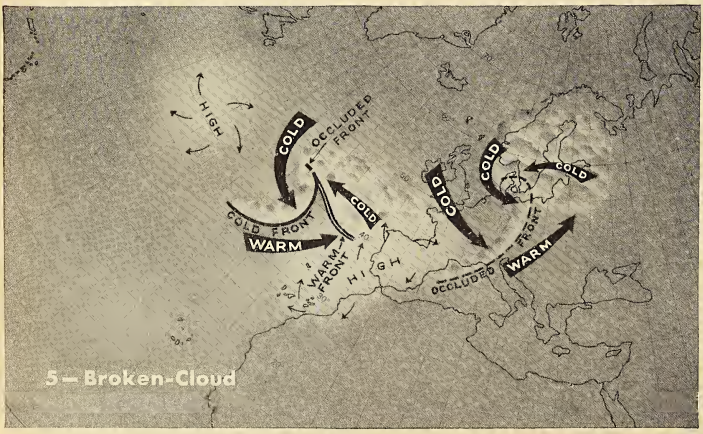
1 Normal winter air flow. Note that the average storm track lies directly over England.

2 The average flow pattern during summer. The large "High" is called the "Azores High." Its eastern end moves north and south, and accordingly allows the storm track to do likewise. When the normal condition is present, as illustrated here, the storms move between England and Iceland with only the most vigorous fronts affecting southern England to a great extent. Occasionally the "High" axis shifts southward and allows storms to pass through the British Isles or the continent.

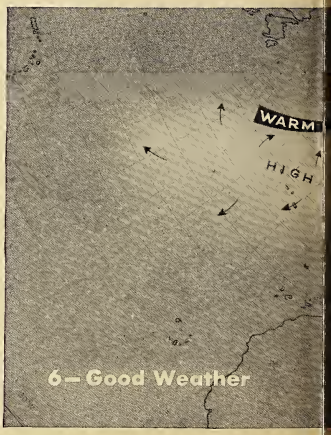
3 A typical summer weather situation which allows clear or nearly clear skies over most of England and the continent during the following 24 to 36 hours.

4 A bad weather situation. This pattern

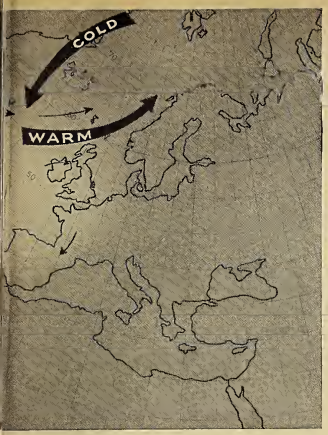
Weather Charts by Techn



5—Broken-Cloud



6—Good Weather



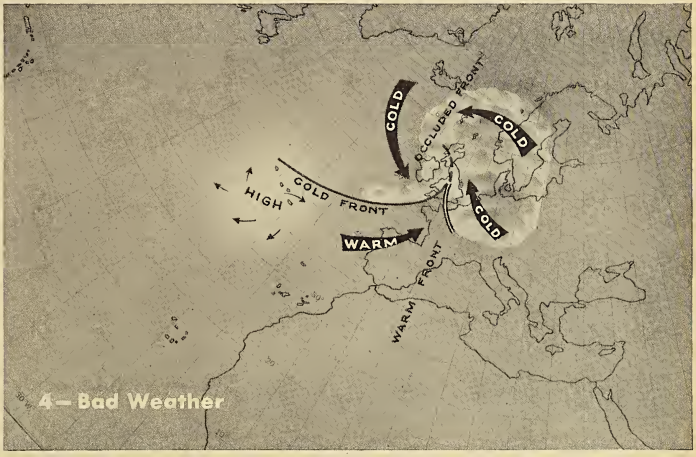
is generally unfavorable for flying. The thick low clouds and rain will persist over most of western Europe and England. Conditions will improve over England shortly after the cold front passes into the channel.

5 A situation which causes broken clouds over France and Germany with widely scattered thunderstorms especially in the mountains. Activity will diminish generally throughout the region as the front advances eastward.

6 A good flying weather type characterized by a northeast-southwest orientation of the Azores "High".

7 An old "Low" has stagnated over the North Sea. Weather conditions will improve very slowly over the continent and the Azores "High" usually extends eastward assuming northeast-southwest orientation of good weather.

Sergt. Ralston Crawford



EUROPEAN *Weather*

By Major Joseph J. George

WEATHER INFORMATION SERVICE, HEADQUARTERS, ARMY AIR FORCES

SUMMER weather over England and Western Europe, bringing with it changes in aerial tactics, demands the studied attention of American airmen particularly since it differs a great deal from summer in the United States.

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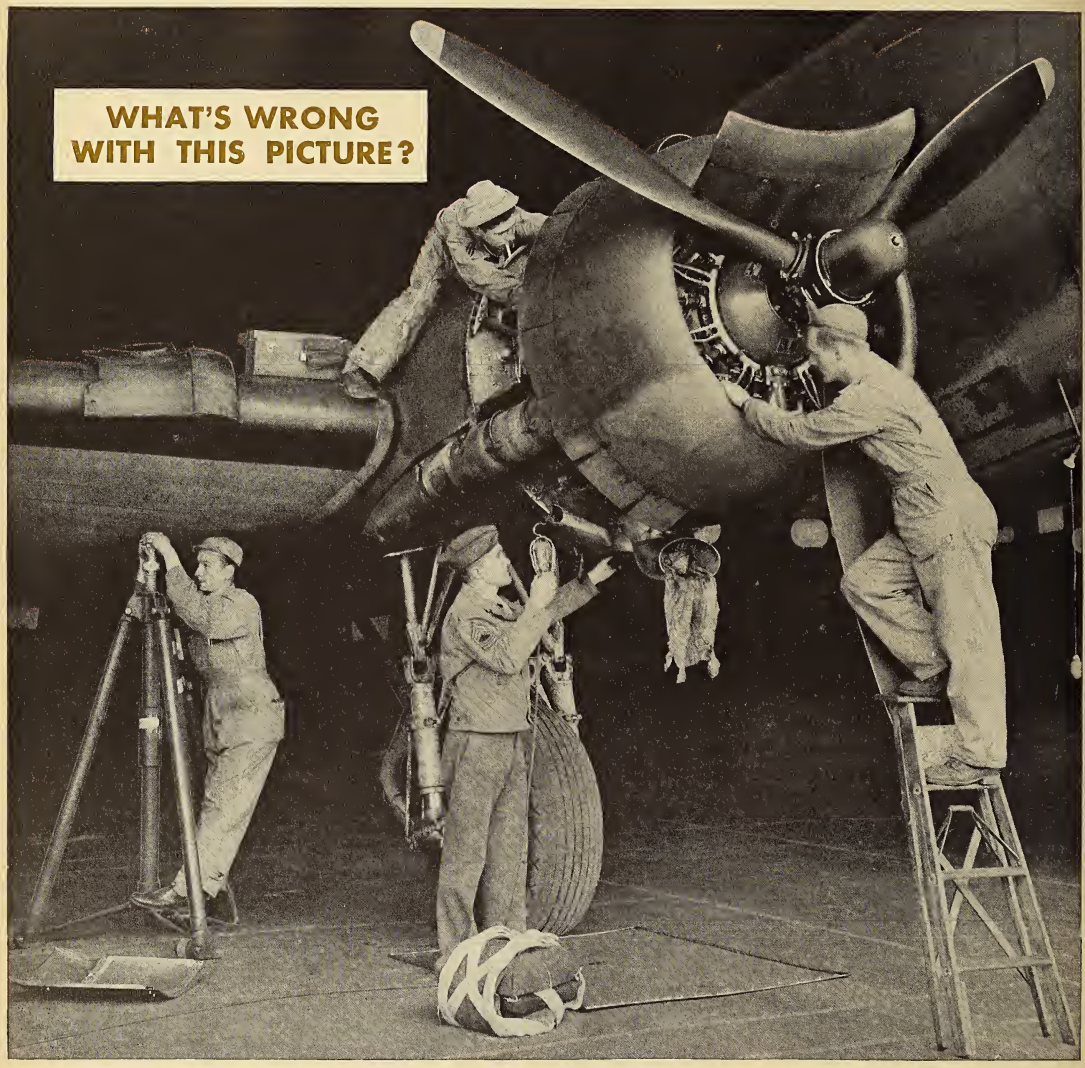
Weather Charts by Technical Sergt. Ralston Crawford

ON THE LINE



It should be easy to find the mistakes pictured above. The errors stick out like a sore thumb.

The boners in this photograph were suggested by Master Sergeant J. A. Bergin who also obliged by posing. He's the NCO holding the light. Others from left to right are Staff Sergeants H. Piergallini and Harry C. Hartleben and Technical Sergeant E. T. Van Sickle. All four are members of Headquarters Squadron, Air Service Command Headquarters, Patterson Field, Ohio.

They cooperated to make this picture knowing that safe and correct maintenance procedure can be mastered only by following Tech Orders and service manuals to the letter.

M/Sgt. Bergin picks nine mistakes in the picture. Can you find more? Answers on opposite page.

A monthly maintenance round-up prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

Did You Know . . .

That we comb the fields far and wide to bring you timely hints and interesting facts on maintenance? This is your column, mechs, and we need your ideas and suggestions to keep it alive and snappy, so mail some in to the AIR FORCE Editorial Office, 101 Park Avenue, New York (17), New York. Especially would we like to get tips from you old timers ON THE LINE to pass along to the many, many younger ones. We promise to print as many as we have space for, giving full credit to contributors, unless you ask us not to. Your suggestions will help others.

This month's ON THE LINE maintenance items have come from men at various bases. Who's next?

Parachutes . . .

You can't exercise too much care in handling parachutes properly. Throwing them from the fuselage to the ground, leaving them on asphalt, cement and surfaces already soaked with grease or tossing them carelessly into bins is asking for trouble. You or your buddies in the flying crews may have to use them some day. See T.O. 13-5-2 for details on handling of parachutes.

A Good Motto . . .

One contributor points out that: A good mechanic is never careless—and a careless mechanic is never good.

Ball and Socket Joint Bolts . . .

Bolts in ball and socket joints of engine controls that become extremely loose cause excessive wear and creeping controls. Proper adjustment can best be made by disconnecting the linkage on either side of the joint assembly, and then adjusting to secure snug sliding fit of ball in its seat without binding at any position. The ball seats in these ball and socket joints are comparatively shallow and if the ball does not seat snugly, excessive wear of the parts will result. Reference: Par. 1, T.O. 01-1-80.

On Locking Controls . . .

Neglecting to lock controls when leaving aircraft, causes serious damage to aircraft control surface, etc., because of exposure to high winds or propeller blasts from other airplanes. On airplanes having internal surface control locks, the locking devices should be engaged whenever both pilots' seats of dual control airplanes, or the pilot's seat of single control airplanes are unoccupied. On airplanes having external control locks, the locks should be installed at any time the airplane is left unattended. Reference: T.O. 01-1-29.

Salvaging . . .

One of the many interesting maintenance stories to come out of the South Pacific is about the salvaging of four P-40s by the men of an AAF Service Squadron.

The P-40s had run out of gas and crash-landed on an out of the way, "hard to get to" island. The pilots were safe.

In order to salvage the valuable plane parts, so difficult to replace in remote areas of the South Pacific, a ramp lighter, a jeep and other supplies including machine guns were loaded on a small steamboat and the picked crew set out for the island.

There they found the planes on a jungle-covered 900-foot plateau almost directly off the beach. Natives, fascinated by their first sight of a truck of any kind, helped in the salvage work just to get a short ride in the jeep.

Two of the planes had crash-landed in good shape, but the other two were damaged severely. Wings, fuselages, motors, guns, radios and other parts were loaded on the jeep and carried to the beach.

There, during the high tide, the heavy parts were put on the steamer by the ramp lighter, while the light parts were carried through the heavy seas in native outrigger canoes. The landing job took three days.

Hats off to a tough job—well done by the mechs of the Air Forces!

(T. O. No. 01-60GB-1)

Be sure area under plane is clear before you open or close bomb doors!

Costly and lengthy repairs, both mechanical and physical, result from carelessness in this respect.

Propeller Time Extension . . .

Did you know that the operating time on most propellers has been extended? See T.O. 03-20-5 revision dated April 2, 1943.

MISTAKES ON OPPOSITE PAGE

Reading from left to right

1. Wait a minute, get that jack clear of the wing before you try to push it down. Do you realize that if the oleo were to lose its pressure or the tire go down, the jack shaft—and your hands—would be shoved right through the wing skin? Reference: Common sense.

2. Hey, you up there on the nacelle, get your foot off the de-icer boot. It wasn't made to stand that kind of treatment. And are you responsible for that piece of cowling and the toolbox on the wing? Looks like they're digging into the de-icer boot, too. And how about that piece of cowling on the floor? Did it fall?

3. And say, buddy, we sure hope you aren't the same mech the camera caught smoking in "What's Wrong With This Picture?" in February.

4. Sergeant, you know better than to use that type of light; according to AAF Regulation 85-6 you should be using a vapor and explosion-proof lamp assembly.

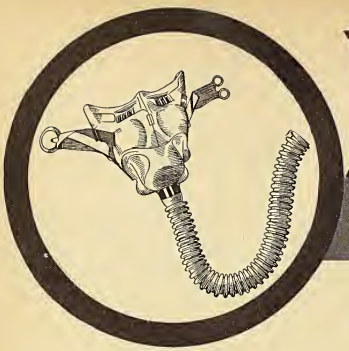
5. And what about that parachute? It's a double mistake. Common sense tells us that it is poor practice to let a chute lie on the floor in the dirt, oil and grease. And T.O. 13-5-2 explains that the main riser webs must never be wrapped around the pack and used as a carrier.

6. Don't use that oil cooler scoop or any other part of the airplane as a rag bin. Aside from the possibility of forgetting to remove the rags before take-off they are a definite fire hazard in the hangar. Reference: Common sense.

7. Never, never place cowling up there in the ring cowl. Besides bending the cowl if it falls, numerous other parts can be damaged or broken.

8. Is that step ladder broken? If it's not, open it up; if it is, get a good one. You are putting a severe strain on the propeller and showing very little consideration for your own safety. And by the way, where's your crew chief stand?

9. Last but not least, why not reel in the trailing antenna before someone hits his head on the fish or tears the wire loose?



OXYGEN IS YOUR LIFE!

By Brigadier General David N. W. Grant

THE AIR SURGEON

FAMOUS last words: "This is just a routine hop so you needn't check the oxygen cylinders. I won't need them."

This pilot's comment is about on a par for common sense with that of the anti-submarine patrol crewmen who insisted they had no reason to learn how to use oxygen equipment because they never flew over 100 feet. And so saying, they were transferred to combat only to discover they were to fly their first mission at 28,000 feet.

It happens every day.

You never know when you are going to need oxygen, so have your equipment ready at all times and on all missions, and *know how to use it.*

Not long ago two bombardiers died needlessly from want of oxygen — and they weren't in combat either. They were on a routine practice flight when they suddenly struck bad weather and had to "go upstairs." These officers did not know how to use a simple piece of equipment, one which, in a matter of seconds, became so important that it meant life or death to them. They are just as dead now as if they had been machine-gunned by the enemy.

Then there is the report of the "wise guy" who thought he knew all about oxygen equipment. But he borrowed a new type of mask from one of his fellow pilots one day and took off in his P-38. After no little difficulty he managed to get the mask on and turned the little red knob on the regulator, not noticing it was marked "emergency." You turned knobs on the old regulator, didn't you? His oxygen was exhausted at 30,000 feet, much to his surprise, and down he came for relief. How fast he came down no one will ever know for by the time he realized what was going on, he had to pull out so tightly his ship came apart all over the landscape. You're skeptical? All right, ask a certain officer in a photo-reconnaissance outfit who pulled the same stunt not many days later but lived to tell the tale. What he knows about oxygen *now* practically makes him an expert.

But that's learning the hard way.

The best scientific minds in the country have devised the best oxygen system in the world for the Army Air Forces. When used properly, it will insure an adequate oxygen supply on flights as high as 40,000 feet. But remember, a piece of equipment is only as good as the man who uses it. Know your oxygen equipment. This means every combat crew member, commissioned and enlisted personnel alike.

The type of oxygen equipment now most widely used in operations is the so-called "demand" type. Unlike the older types in which oxygen came from the regulator at all times and the flow had to be increased with altitude, the demand type provides oxygen only when you inhale. When you exhale, the flow stops. Furthermore, the demand type does not need adjustment with altitude; it is automatic.

ON the side of the demand regulator is a little handle which controls the "Auto Mix." It has two positions, "On" and "Off." When the handle points to the "On" position, you get a mixture of oxygen and air. As you gain altitude, you get more oxygen and less air. This mixture is automatically controlled by the regulator. In the "Off" position you get only oxygen—but all you need. Unless otherwise instructed, use your regulator with the "Auto Mix On."

Now, that red knob marked "emergency". Use it only for that if the "demand" mechanism fails or your mask leaks badly, *open the emergency knob,* but remember, you're then using your oxygen so rapidly your supply will soon be exhausted.

1. This is the new A-10 (Revised) oxygen mask, scheduled for widespread use among flying personnel by June 1. Like the A-10, it operates with the Demand Regulator but fits more snugly and is attached to the helmet.

The demand mask must fit perfectly. It must not leak since the pressure changes that occur during breathing control the regulator. See that your mask is fitted for you and checked often by someone who *knows* how. This someone is your unit oxygen officer.

Oxygen officers are being assigned to each combat squadron to see that officers and men use and understand new oxygen equipment.

For many months, the Aero-Medical Laboratory at Wright Field has been developing new oxygen devices for AAF planes. These projects have provided greater flexibility, economy and dependability in oxygen equipment. They have made it possible for combat crews to move about freely during long flights with portable equipment, "walk-around bottles", and for fighter pilots to bail out from high altitudes with oxygen in a portable flask.

Research during the development of these devices has established the desirability of using oxygen at all altitudes from the ground up on night flights. This research has shown that night vision stays constant at all altitudes if oxygen is used, but that when it is not used, night vision drops approximately one-fifth at 5,000 feet and one-half at 15,000 feet.

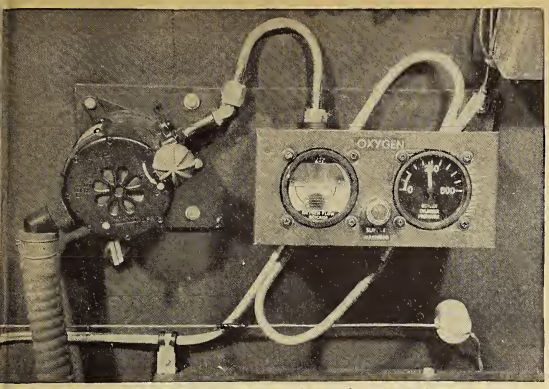
Other equipment developed includes a mobile oxygen generating plant, a dryer to remove excess moisture which could form ice in the oxygen system, and special vehicles which carry large master cylinders to fill up oxygen tanks in the planes.

These developments have added complexity to the oxygen systems. So special officers have been trained to show you how to handle your oxygen equipment skillfully and intelligently.

Take good care of your mask, too. Rubber is as difficult to get for their manufacture as it is for tires.

In addition to the oxygen officer, your flight surgeon is always ready and willing to advise you in any oxygen problems you may have. Check in with these officers and get checked out properly on oxygen equipment.

It may mean your life someday. ☆



2. This typical oxygen installation shows the Demand Oxygen Regulator, with auto-mix turned "ON", and the oxygen instrument panel, consisting of the A-1 type flow indicator, in which the bouncing ball shows the flow of oxygen with respiration, and the K-1 type pressure gauge to measure tank pressure.

4. Above is pilot in a multi-place plane equipped with A-10 Demand Oxygen Mask. Similar precautions must be exercised in avoiding leaks with the revised A-10 as with this mask in order to insure proper regulator operation.

USE OXYGEN INTELLIGENTLY

DO

Use oxygen above 10,000 feet on all flights.

Use oxygen from the ground up at night or on rapid ascents to high altitude.

Breathe normally.

Adjust your mask carefully and eliminate leaks before take-off.

Be thoroughly conversant with your oxygen equipment and the reasons for its use.

Report faulty function of oxygen equipment promptly.

Check your oxygen equipment before take-off and frequently during flight.

DO NOT

Do not fail to insure full cylinder pressure and an adequate supply of oxygen for your mission.

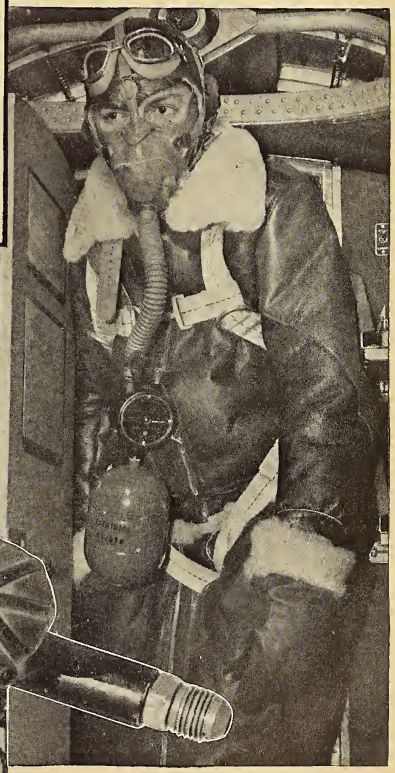
Do not fail to use your own fitted mask and necessary connecting tubing.

Do not leave your walk-around and bail-out oxygen bottles in your locker. You may need them.

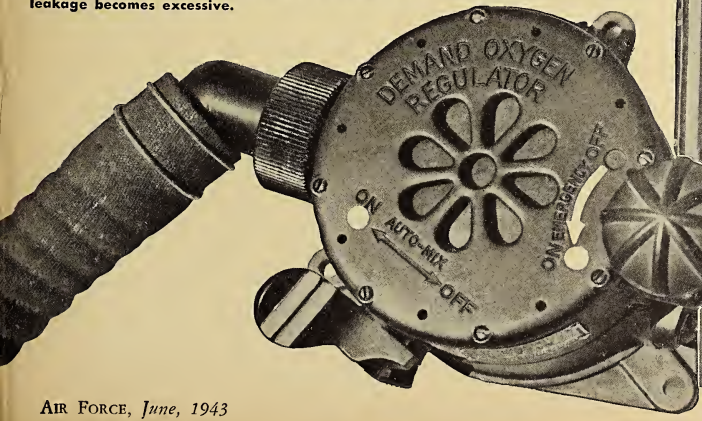
Do not waste your oxygen supply by needlessly high flows.

Do not take liberties at high altitude by walking about the aircraft without portable oxygen bottles, or by failing to turn on the oxygen supply in time.

5. This crew member displays good sense by using the portable oxygen unit, known as the walk-around bottle, while moving about in a plane at high altitude. The equipment is used with the A-10 mask and provides a 4- to 8-minute supply of oxygen, depending on the altitude and the activity of the user.



3. This close-up of the Demand Oxygen Regulator, used with both the A-10 and A-10-R masks, shows the auto-mix lever in the "ON" position. Here the regulator furnishes the proper mixture of air and oxygen on demand at all altitudes. Starting with little or no oxygen at sea level, the mixture becomes enriched until 100 percent oxygen is supplied at about 30,000 feet. If the auto-mix handle is placed on the "OFF" position, the regulator gives pure oxygen on breathing at all altitudes. The Emergency knob should be used only if the demand system fails to function or mask leakage becomes excessive.



THE WAY TO EFFECTIVE TEACHING

By MAJOR LYMAN I. COLLINS

CHIEF, OPERATIONS SECTION, AAF TRAINING AIDS DIVISION

HIDDEN away in the squadrons over the country are thousands of good training ideas that never get out, and there are training officers everywhere who could and would use them if they had the chance.

This is a situation which implies both difficulty and promise. Individual initiative and independent achievement have been encouraged in the Army Air Forces from top to bottom. Both officers and enlisted men have responded. Now the need for coordination, the bringing together of the mass of developments, has become important. This is a function of the Training Aids Division. In an effort to see that what is known *anywhere* about training aids will be known *everywhere,* AFTAD liaison officers have been assigned to cover ten of the key AAF units in the United States.

As the Army Air Forces has grown, so has the number of instructors. And as combat conditions have become more varied, the problems of training have multiplied in number and complexity.

Teaching and learning come best when there is a union of patient, informed instructors, eager students, time and necessary equipment. Note the last two. At the moment time is precious and new equipment needs are just being discovered and developed. Emphasis must be on speed. Review and repetition are the luxuries of a more academic peacetime. What is taught must be absorbed immediately. Otherwise, the casualty lists grow longer.

UNQUESTIONABLY the lecture—the oral explanation—is not by itself the best teaching instrument. The man in front of a class must supplement his words with life and substance. He must find and use all the concrete aids possible. He must show what he talks about. He must demonstrate. He must have student participation. He must provide materials for out-of-class study.

What is needed and what is available for effective teaching?

1. Where the subject matter is static (the nomenclature of instruments, the items in a kit, the organization of a unit, etc.) posters and film strips are immediate helps in economizing the learning effort.

2. Where the subject matter is dynamic, where action and performance count, where attitudes are to be inculcated, as in "Learning How to Salute," "Removing the Engines from the C-46," "How to Fly the A-20," "Beyond the Line of Duty," or "Mr. Blabbermouth," moving pictures are invaluable in conveying the ideas, and in preserving the interest and attention of students.

3. Where basic facts and doctrine must be learned until awareness of them is instantaneous and where problems must be worked out, manuals, handbooks and study guides become the "bibles" of those eager for proficiency.

4. Where the acquisition of skills of all sorts is required, students have to "feel" and try out what must be known. It is a practical axiom that a man who is to know how to fly blind or shoot a machine gun has sooner or later to be put in a cockpit to go through the actual performance.

HOWEVER, the supply of ammunition and the number of planes are not inexhaustible. Even more important is the safety factor. When beginners are given highly complex machines to be put through difficult maneuvers there is always the possibility of injury. To eliminate such hazards as well as effect savings in material, synthetic training devices—substitutes which permit actual participation—have long since proved their worth. So rapid has been the development of these devices that one can now fly a 1,000-mile bombing mission, shoot enemy planes in transit, take pictures of enemy concentrations, compute the navigational data en route, and sight and bomb the objectives—without leaving the ground.

The Training Aids Division serves as a clearing-house of information and advice concerned with the acquiring and listing of all films, film strips, manuals and handbooks, posters and synthetic devices now in use by the Army Air Forces.

AFTAD liaison officers have the task of telling directors of training what is available and seeing that devices and guides developed locally and used effectively are procured for others who could use them.

These liaison officers have authority to give immediate approval to the organization and use of all training aids developed within the Commands and Air Forces. Each officer is charged with responsibility of transmitting descriptions and, where practicable, copies of training aids developed within his jurisdiction to AFTAD Headquarters, and from there information is channeled to the other liaison officers, to be passed on to C.O.s in their respective unit areas. They are given advance notice of the publication of catalogues and lists and are kept advised of the progress on new projects. They know through AFTAD of the obsolescence of training materials. Working through their individual headquarters, they learn of pressing needs for certain kinds of equipment; then working with AFTAD they seek to expedite the effort to procure that equipment.

When special aids are needed on loan for short periods, they may often be obtained through AFTAD. On occasion, when charts, posters, models, manuals and the like, fail to reach those who need them most, liaison officers are available to assist in new requisitions.

To accomplish this job liaison officers from AFTAD are now on duty at the following headquarters:

Anti-submarine Command, New York City; Air Service Command, Patterson Field, Fairfield, Ohio; Flying Training Command, Fort Worth, Texas; Materiel Command, Wright Field, Dayton, Ohio; Technical Training Command, Knollwood Field, Southern Pines, North Carolina; 1st Air Force, Mitchel Field, Hempstead, Long Island, New York; 2nd Air Force, Ft. George Wright, Washington; 3rd Air Force, Tampa, Florida; 4th Air Force, San Francisco, California; Flight Control Command, Winston-Salem, North Carolina.

SYNTHETIC COMBAT

By LIEUT. CHARLES S. KOPACZ
AAF Training Aids Division

HE had chased that enemy plane all over the sky, had done very well with his rudder and stick. When the enemy streaked through his sight, he fired away. But his aim was bad. That blasted buck-tooth was making a monkey of him.

Coming out of a turn, the enemy momentarily flitted into the fighter's sight. The kid was thinking better now. He started to pull the triggers, hesitated, thought. He touched the controls lightly, and aimed not at where the enemy was, but at where he would be in a moment.

The guns chattered. There was a bright red flash in front. He had hit and the fight was over.

The kid looked a little sheepish as he stepped out of the cockpit and faced the captain. He knew what was coming.

"Well, you finally got him, son." Here was the dressing down. "Good thing you weren't in the sky for that performance. Pretty rotten, wasn't it?"

The kid admitted it. The captain softened.

"Don't let it worry you. I'm glad you don't have to get off the ground to do your practicing."

THE kid had been operating a standard synthetic contraption. Before he got the feel of the thing, he had made mistakes that might have cost his life if he hadn't had a ground buggy to practice in.

The entire combat situation was there—that is, everything except the hazard to life and aircraft. He had all the controls to operate while he manned his guns. The targets had flitted about in a make-believe sky, as elusive as enemy planes would have been in the real show.

This kind of training could go on twenty-four hours a day if necessary and at any place where there is a live wall socket to plug in the gadget.

There isn't any argument about training of this sort. With synthetic devices the student learns by doing. They give him the feel, but they save lives and planes and guns and gasoline. Bad weather needn't keep novice pilots out of indoor cockpits.

These gadgets aren't for the fighter pilot alone.

A student gunner practices in a synthetic bomber turret for all the world like the real thing. He can be made to feel that the enemy is attacking from all directions. If the gunner's hands are skillful, the turret responds properly.

There are equally effective devices for the navigator, radio operator, flight engineer, bombardier, photographer, meteorologist and armorer. They range from simple, home-made gadgets to elaborate and expensive factory-produced devices.

The genius of the whole Army Air Forces has gone into the development of synthetic training devices. The results are found in jeep gunnery ranges, link gunnery trainers with BB guns, radar trainers, photographic trainers and navigation trainers, literally hundreds of contrivances remarkably like the things they simulate.

To coordinate the development, procurement and distribution of these devices, a Synthetic Training Section has been set up as part of the Training Aids Division. The first job of this section, obviously, was to find out what synthetic devices already were in use or in process of development. Every activity of the Army Air Forces, the Canadian and British air forces, and the Navy were asked to report on their activities in the synthetic field. The replies brought a wealth of information.

The reports were classified and listed for use in a catalog for distribution throughout the Army Air Forces. To keep all AAF activities current on synthetic devices, supplements will be issued from time to time. Through this method, the Training Aids Division hopes to make each AAF unit's efforts available to every other unit.

INDEPENDENT initiative in developing synthetic training appliances is encouraged. In the Training Aids Division, the AAF inventor has an agency to which he can send his inquiries about whether a particular device is in existence, how to get one, or—if the project is still in development—the status to date.

Many times, adjoining fields have developed similar devices independently. It is the function of the AFTAD to prevent such duplications of effort, to make possible an effective pooling of energy and talent.

Every activity has its problems with synthetic devices. A function of the Training Aids Division is to disseminate generally the information on how these problems have been solved locally.

At one station, a link gunnery range officer observed recently that there was a high percentage of misses. Investigation disclosed that firing while skidding was the chief cause. His department tried in vain to foolproof the trainer. The problem was placed in the hands of experts and was solved immediately. They fixed the trainers so that the guns would not fire unless the turn-and-bank indicator ball was centered.

An AAF station needed large computers for classroom demonstration. The sub-depot built one, consuming valuable time needed on other tasks. Investigation would have shown that suitable computers were readily available commercially.

Often the solution of these problems is more difficult. It may require consulting the Experimental Laboratory, civilian scientists, the Signal Corps, the Navy Bureau of Aeronautics or the RAF. The Training Aids Division has the job of finding the answers.

WHAT THEY'RE READING

By LIEUT. JAMES GOULD COZZENS
AAF Training Aids Division

DURING the winter of 1778-79 the American Army's first piece of training literature was composed. The work was undertaken by a foremost authority on military training but he found it difficult because he did not know the English language. He did know French of sorts, so laboriously he put his ideas into French. Then it took three members of his staff, in turn, to convert the work into literal French and eventually into the "King's English." On March 29, 1779, *Regulations for the Order and Discipline of the Troops of the United States* was published by Act of Congress at Philadelphia. The author was Baron von Steuben.

This new publication, called the military blue book, became the bible of the Continental Army. Part of it was a drill manual, but the Baron attempted a great deal more than merely to prescribe formations. He meant to cover, as well as it could be covered in a book, what strategists call technique. He explained specific military jobs. He also told the men how to be good soldiers and good officers.

That the Baron imagined his blue book, or any other book, was going to make the reader a finished soldier is unlikely. Finished soldiers are made by fighting, not by reading; but, then as now, there were important things that could be learned from a book by anyone of reasonable intelligence. In fact, some points could be better learned from a book, for the alternate instruction came in the form of bitter combat experience. The purpose of the Baron's blue book was to teach men their military jobs the easy way. That is still the purpose of training literature. Soldiers cannot go into combat with a field manual in one hand, but they can go into combat with the manual lessons in their heads.

The Training Literature Section of the Training Aids Division supervises the production of training literature for the Army Air Forces. Its specific functions include, besides the actual writing of training literature, approving and coordinating the development, distribution and use of material from all sources, eliminating duplication of effort, reviewing and editing and acting as a clearing house and information center where all branches of the Air Forces can find out what literature is available.

The weapons of the Air Forces are complex and complicated, and miles of type and hills of paper are devoted strictly to technical instructions for using and caring for this equipment. This mass of technical material clears through AFTAD.

This also is true of manuals on the tactics and technique of air fighting, of air attack, of torpedo and incendiary bombing; on flexible gunnery; on emergency procedures; on the duties of combat crew members, of officers in tactical squadrons and groups, in base operations, in air depots and service centers.

Making such manuals available presents problems. For one thing, any manual dealing with tactics deals with something that, in the Air Forces at least, is constantly changing. Yesterday's tactics are often ineffective today and perhaps suicidal tomorrow. Baron von Steuben's material might have had to be translated from the German in which he thought, to French, to English, but at any rate the points to be made did not change as fast as he wrote them down.

Not only does the content of a manual have to be authentic and properly prepared, but the treatment of this material must be considered. This depends largely on the type of manual being compiled. In the case of such subjects as Elementary Physics for Air Crews, or Mathematics for Bombardiers and Navigators, it is plain that no amount of art or artifice in presentation will teach physics or mathematics without effort on the student's part. A man who takes up either manual does so because he has to master its information before he can go on with his job.

On the other hand, such field manuals as a forthcoming one on Local Ground Defense of Airdromes can be made more interesting and even more instructive by profuse illustration. In a few instances—for example, a new Air Forces handbook on physical fitness—something approaching the painless technique of the comic strip will work. ☆

WHERE TO GO

Information on the availability of training films and film strips, aircraft recognition materials, synthetic training devices and training literature may be obtained from the Training Aids Division, Army Air Forces, No. 1 Park Avenue, New York, N. Y. (Formerly located in the Florida Bank Building, Orlando, Fla.—Ed.)

FLORIDA'S COMBAT THEATRE

(Continued from Page 9)

Ground crewmen at the same time will be learning to overcome problems they will be called upon to face in these same theatres. The AAFSAT training course lasts for one month. Then your cadre will return to its parent training Air Force, where the remaining personnel required to round out the new bombardment group will be assembled. Officers and men who have been to AAFSAT then will pass along to the rest of the group tactical combat pointers taught them in Florida, before departing for overseas duty.

This same procedure is followed by fighter, air support and air service cadres, all of whom get their own academic instruction, then join in framing demonstration missions.

To carry out both the instruction and tactical developments missions, each of AAFSAT's Departments operates as a normal tactical command with an academic section superimposed upon it. Let's take the Air Defense Department as an example.

The Fighter Command this Department represents is composed of the Orlando Air Defense Wing, with a Wing Headquarters, a Fighter Group, an Air Warning Battalion, two Night Fighter Squadrons and two Fighter Control Squadrons. This setup involves a standing personnel of approximately 3,000 officers and men, who operate some 125 tactical aircraft. In addition, the academic section consists of the necessary supervisory personnel, school troops and instructors.

A BRIEF breakdown of typical courses offered in the Air Defense Department will be of interest to personnel engaged in the several phases of fighter aviation training.

A course is given for communications officers and enlisted men in radio maintenance and the operation of radio equipment in fighter control squadrons. In another course, officers are instructed in controlling fighter aircraft in flight from the ground. This course covers controlled interception, both synthetic and actual, navigation, weather and identification of aircraft.

The Signal Corps handles courses for personnel trained in the Aircraft Warning Service. These include filtering information derived from radio locator points scattered throughout the AAFSAT theatre of operations, the inspection, operation and maintenance of special radio locator equipment, the recognition and reporting of aircraft by ground observers, and the theory and tactical employment of signal communication system as it pertains to A.W.S.

The Coast Artillery instructs Coast Artillery officers and men assigned to the Air Forces in the employment of searchlights and anti-aircraft artillery in a unified air defense system.

These courses, it may be noted, are in addition to the academic and tactical training of fighter pilots, and administrative and service personnel in fighter group cadres. Included in this part of the Air Defense Department's responsibility is the training, activation and commitment of night fighters.

An example of the tactical adaptation of academic courses may be found at the outlying bases of the Air Support Department.

At one airdrome specially equipped A-20s practice the employment of minimum altitude bombing tactics (sometimes called buzz- or skip-bombing), developing refinements of a technique employed so successfully in the Bismarck Sea engagement last March. Dive bombers at this same field blast targets in practicing dive-bombing techniques — some of them established in actual combat operation, others developed by instructors and students at this base.

SEVERAL miles away, at another airdrome, paratroops, glider troops and other airborne personnel work out under simulated battle conditions, dropping behind imaginary lines and capturing an "enemy" base in the prosecution of a special field problem. From yet another base, planes take off for a sector and try to rout ground troops with tear gas. Other aircraft, ranging from liaison Cubs to the speedier P-39s and A-20s, are used in special observation problems.

Just as the bombardment and fighter personnel receive plenty of synthetic training before heading for outlying bases, Air Support students are given similar academic preparation by working out problems around sand tables supporting miniature villages and "enemy" terrain.

Aside from its vital role in academic instruction, the Air Service Department is charged with responsibility of supplying and maintaining active combat units in the AAFSAT theatre airdromes. Actively aiding in the supervision of this mission are specialists from the Quartermaster Corps, Signal, Medical, Ordnance, Chemical Warfare and Engineer Corps, who have been assigned to the Air Forces. They augment the staff of Air Corps maintenance, technical supply and administrative personnel.

From the standpoint of organization, AAFSAT consists basically of four "directorates", an air staff and four Departments. Brigadier General Gordon P. Saville, former Director of Air Defense, Headquarters, Army Air Forces, is the Director of Tactical Development; Colonel H. W. Holden, the Director of School Activities; Colonel C. W. Lawrence, Director of Academic Training, and Colonel R. A. Day, Director of Operations and Facilities. Colonel Day also serves as Chief of the Air Staff.

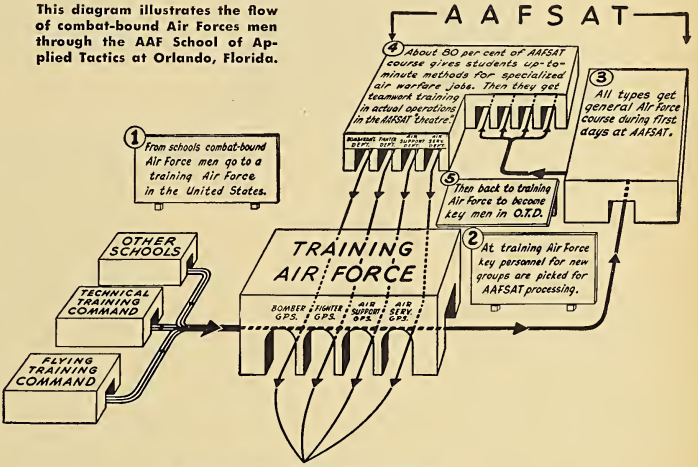
Staff members are Major C. H. Ferguson, A-1, Lieutenant Colonel E. F. Luna, A-2, Colonel A. H. Foster, A-3, and Colonel C. C. Berry, A-4.

The Department heads, who also are commanding officers of the corresponding Commands in the field, are Assistant Commandants of AAFSAT. They are Colonel E. W. Barnes, Air Defense, Colonel H. G. Montgomery, Jr., Bombardment, Colonel M. H. McKinnon, Air Support, and Colonel J. M. McCulloch, Air Service.

You officers and men who are assigned to AAFSAT for training should bear in mind that you are coming to a theatre of operations. You must be prepared to live and operate under circumstances similar to those experienced from day to day by Air Forces personnel already in combat theatres. Don't bring along your families, automobiles and household belongings. You will have little or no opportunity for personal, domestic interests, and you will only add to the already over-crowded living conditions in the Orlando civilian area.

It is important that you come to AAFSAT not merely with an open mind but prepared to ask questions and plenty of them. One question asked or one problem posed by you may result in the development of a technique which can be employed to good advantage against the enemy. ☆

This diagram illustrates the flow of combat-bound Air Forces men through the AAF School of Applied Tactics at Orlando, Florida.



COMBAT AIR FORCES


Lt. Wm. L. Baker


Col. C. B. Overacker, J


Capt. Richard H. Becl


Lt. Elsie S. Ott

CONGRESSIONAL MEDAL OF HONOR

BRIGADIER GENERAL Kenneth N. Walker*. **COLONEL** Demas Thurlow Craw* (Also Purple Heart*).

DISTINGUISHED SERVICE CROSS

MAJORS: John R. Alison, John W. Mitchell. **CAPTAINS:** William E. Dyess, Elbert O. Meals, Victor Emanuel Walton. **LIEUTENANT** Jack W. Hall. **TECHNICAL SERGEANT** Arthur G. Kelly*. **STAFF SERGEANTS:** Albert L. Catallo (Also Purple Heart), Doyle Kimmey*. **SERGEANT** Stanley A. McLeod*. **CORPORAL** William T. Anderson.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERAL Robert Olds. **COLONELS:** Orrin L. Grover, Robert F. Tate.

Oak Leaf Cluster to Distinguished Service Medal

BRIGADIER GENERAL Alfred J. Lyon*.

SILVER STAR

COLONELS: Truman H. Landon (Also Distinguished Flying Cross), Homer L. Sanders. **LIEUTENANT COLONEL** Horace M. Wade. **MAJORS:** Alexander G. Evanoff, Elbert Helton (Also Purple Heart), George T. Ingram, William E. Kinney (Also Oak Leaf Cluster to Silver Star, Distinguished Flying Cross with Oak Leaf Cluster and Oak Leaf Cluster to Air Medal), Frank J. Puerta (Also Distinguished Flying Cross), Robert B. Sullivan (Also Distinguished Flying Cross and Air Medal with Oak Leaf Cluster), Jack A. Wilson. **CAPTAINS:** Richard H. Beck, William A. Brown, Walter Clark, Paul E. Cool, Charles W. Dunning*, Charles A. Fletcher, Jr., Robert J. Hughey, Mark T. Mooty, Christian Petri, Jr., Albert W. Schinz, Donald A. Simpson, Raymond A. Sloan, William Taggart. **LIEUTENANTS:** John D. Bailey, William L. Baker, Roy R. Bright, Charles S. Brown, Charlie Bull, Frank C. Busbee, James W. Cain, Hans C. Christiansen* (Also Purple Heart*), Paul E. Dawson, Henry P. Elias*, Edgar G. Gammon, Jr., Elmer G. Ghram, Robert T. Golberg, Donald A. Graham, Samuel C. Grashio, Walter E. Gurley, Sanford W. Hickey, Michael Joseph Ingelido, Henry A. Keel, John D. Lombard, Jack C. McIntyre, Leonard P. Marks, Edward M. Nollmeyer, Bernard J. Oliver, Charles W. Peterson, Russel K. Pierce, Jr., Victor J. Poncik (With Oak Leaf Cluster), Gustav H. Radebaugh, Francis D. Riggin, William R. Rodgers, Alexander R. Salvatore, Walter T. Schmid, Vernon L. Scott, Philip K. Shriver, Henry M. Sparger, Roderick M. Stewart, Earl R. Stone, Jr., Richard C. Suehr, Euel A. Travis, Alden N. Wood, James L. Yelvington (Also Purple Heart). **MASTER SERGEANTS:** Thomas J. Crumley, William F. Myers. **TECHNICAL SERGEANTS:** Walter V. Cheek, James F. Shoup. **STAFF SERGEANTS:** Norman K. Frost (Also Purple Heart), William T. Jent, George A. Kielbasa (Also Purple Heart), John E. Lillback, John J. Meehan, Donald T. Ostlund (Also Purple Heart), Burnell Walker. **SERGEANTS:** Charlie Barnes, A. G. Blackwelder, Jr., Robert H. Burns (Also Distinguished Flying Cross), Calvin W. Croom, Lewis DeSimone (Also Distinguished Flying Cross), Perry Doty, Alfred H. Fawe, Ray D. Holcomb, Kenneth L. House, Daniel J. Keller, Henry P. McNeill, Jr., James W. Miller, Guy E. Reynolds, Thomas E. Ross*, John R. Walker. **CORPORALS:** Francis R. Neis, Albert F. Osterhaus, Robert D. Smith, George R. Zenz. **PRIVATE FIRST CLASS** Mack B. Anderson. **PRIVATES:** Wiley O. Cart, Otto Russell.

Oak Leaf Cluster to Silver Star

CAPTAINS: John Herbert Posten, Robert E. Thacker. **LIEUTENANTS:** Feaster A. Norwood, Adrian J. Sampeck, Edward R. Yerington. **TECHNICAL SERGEANT** Bernardino O. Tortora. **SERGEANTS:** Claude J. Fraley, Regis D. Weinfurther.

* Posthumous

ROLL OF HONOR

Col. Robert F. Tate

T/Sgt. J. Marling

Capt. Warren A. Beth

Lt. John D. Bailey

Maj. J. R. Alison

Lt.Col.J.W.Chapman,Jr.

Lt. John J. Boll

Maj. Frank L. Puerta

Sgt. W. T. Majewski

Capt. R. C. Lycan

Maj. Gen. W. H. Hale

Sgt. Lee E. Nelson

PURPLE HEART

MAJOR GENERAL Willis H. Hale. **BRIGADIER GENERAL** Howard C. Davidson. **COLONELS:** William L. Boyd, William C. Farnum, William J. Flood, Clarence S. Thorpe, Leonard D. Weddington. **LIEUTENANT COLONELS:** Brooke E. Allen, James W. Chapman, Jr., Ted S. Faulkner (Also Distinguished Flying Cross), Ralph F. Friedenthal, Fernando Green, Andrew A. Meulenberg. **MAJORS:** William G. Benn, John E. Dougherty, Edward V. Hughes, William H. Monay, Raymond E. Nelson, John J. Thornhill (Also Distinguished Flying Cross and Air Medal), Francis C. Tremayne, Ralph M. Wanderer. **CAPTAINS:** Haley W. Aycock, Harvey C. Bauss, Frank P. Bender, George A. Blakey, James G. Carroll, Gerald J. Crosson, Maurice W. Dale, Oliver C. Doan, William S. George, Jr., Max Goldman, Denver D. Gray, Ralph J. McBride (Also Air Medal), John C. Nissen (With Oak Leaf Cluster), George Rawlins. **LIEUTENANTS:** Bernard E. Anderson, Alfred Asch, Melvin E. Brown, Malcolm J. Brumwell*, Norman Bryant, Ralph C. Carey, Linden W. Cochran, James A. Daughtry (Also Air Medal), Clyde E. DeBaun, Harry E. Erickson, Fred N. Featherstone, Jr., John G. Foster, Richard Booth Gardner (Also Air Medal), Balfour C. Gibson, John G. Glover, Johon S. Greene, George L. Hasik, Herbert N. Henckell, Jr., Robert J. Hinson, Richard R. Hopper, Lyle G. Karnath, Aleron H. Larson, Virgil B. Lindsey, Daniel A. McColl, John B. McManus (Also Air Medal), Edgar V. Markley, Lee N. Minor, Jay E. Pietzsch*, John F. Twilley, Leland A. Walker, Jr., George A. Whiteman*, John P. Wright, Howard N. Young, Melvin D. Zajic. **MASTER SERGEANT** Stanley A. Hunt. **TECHNICAL SERGEANTS:** John T. Brogan, Victor J. Cozza, Donald E. Hiatt, Herman C. Reuss*, Garland B. Smith, Pete M. Vasalie. **STAFF SERGEANTS:** George M. Ashe, LeRoy H. Blonshine, Felix Bonnie*, John W. Carney, Harold C. Elyard, Paul V. Fellman*, Norman Holm (Also Air Medal), James A. Malone, Ralph E. Nau, Julius Schellenberg, William P. Wallen. **SERGEANTS:** Theodore L. Billen, Andrew H. Burnett, Harold O. Christiansen, John R. Conklin, Guy E. Dority, Patrick L. Finney*, Edward M. Jones, John B. Kraft, Edward B. Malinay (Also Oak Leaf Cluster to Silver Star), Robert H. Martin, Murel A. Murphy, Carson C. Richardson, Leland E. Taylor, Henry Wojciechowski (Also Air Medal), Rufus W. Youngblood. **TECHNICIAN FOURTH GRADE** Oliver T. Beyer. **CORPORALS:** Woodrow W. Brakefield, Richard A. Dickerson*, Edward P. Dwelis (Also Air Medal), Howard N. Lusk*, Walter B. Morrison, LaVerne J. Needham*, John M. Norquist, William H. Offutt*, Watson F. Parker, William F. Swain. **TECHNICIAN FIFTH GRADE** Clair E. Burt. **PRIVATES FIRST CLASS:** Raymond A. Chamberland, Eugene B. Denson, William C. Dryman, George F. Howard*, Sherman Levine, Richard E. Livingston*, Durward A. Meadows*, Sam C. Peticolas, Thomas E. Schofield, Ralph S. Smith, Johnnie F. Specht, Jerome J. Szematowicz*. **PRIVATES:** Manfred C. Anderson*, Gordon R. Bennett, *(Continued on Next Page)*

Air Forces ROLL

A monthly record of decorations awarded to personnel of the Army Air Forces.


Lt. Wm. L. Baker


Col. Robert F. Tate


T/Sgt. J. Marling


Col. C. B. Overacker, Jr.


Lt. John D. Bailey


Maj. J. R. Alison


Capt. Richard H. Beck


Lt. John J. Boll


Maj. Frank L. Puerta


Lt. Elsie S. Ott


Capt. R. C. Lycan


Maj. Gen. W. H. Hale

CONGRESSIONAL MEDAL OF HONOR

BRIGADIER GENERAL Kenneth N. Walker*. **COLONEL** Demas Thurlow Craw* (Also Purple Heart*).

DISTINGUISHED SERVICE CROSS

MAJORS: John R. Alison, John W. Mitchell. **CAPTAINS:** William E. Dyess, Elbert O. Meals, Victor Emanuel Walton. **LIEUTENANT** Jack W. Hall. **TECHNICAL SERGEANT** Arthur G. Kelly*. **STAFF SERGEANTS:** Albert L. Catallo (Also Purple Heart), Doyle Kimmey*. **SERGEANT** Stanley A. McLeod*. **CORPORAL** William T. Anderson.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERAL Robert Olds. **COLONELS:** Orrin L. Grover, Robert F. Tate.

Oak Leaf Cluster to Distinguished Service Medal

BRIGADIER GENERAL Alfred J. Lyon*.

SILVER STAR

COLONELS: Truman H. Landon (Also Distinguished Flying Cross), Homer L. Sanders. **LIEUTENANT COLONEL** Horace M. Wade. **MAJORS:** Alexander G. Evanoff, Elbert Helton (Also Purple Heart), George T. Ingram, William E. Kinney (Also Oak Leaf Cluster to Silver Star, Distinguished Flying Cross with Oak Leaf Cluster and Oak Leaf Cluster to Air Medal), Frank J. Puerta (Also Distinguished Flying Cross), Robert B. Sullivan (Also Distinguished Flying Cross and Air Medal with Oak Leaf Cluster), Jack A. Wilson. **CAPTAINS:** Richard H. Beck, William A. Brown, Walter Clark, Paul E. Cool, Charles W. Dunning*, Charles A. Fletcher, Jr., Robert J. Hughey, Mark T. Mooty, Christian Petri, Jr., Albert W. Schinz, Donald A. Simpson, Raymond A. Sloan, William Taggart. **LIEUTENANTS:** John D. Bailey, William L. Baker, Roy R. Bright, Charles S. Brown, Charlie Bull, Frank C. Busbee, James W. Cain, Hans C. Christiansen* (Also Purple Heart*), Paul E. Dawson, Henry P. Elias*, Edgar G. Gammon, Jr., Elmer G. Ghram, Robert T. Golberg, Donald A. Graham, Samuel C. Grashio, Walter E. Gurley, Sanford W. Hickey, Michael Joseph Ingelido, Henry A. Keel, John D. Lombard, Jack C. McIntyre, Leonard P. Marks, Edward M. Nollmeyer, Bernard J. Oliver, Charles W. Peterson, Russel K. Pierce, Jr., Victor J. Poncik (With Oak Leaf Cluster), Gustav H. Radebaugh, Francis D. Riggin, William R. Rodgers, Alexander R. Salvatore, Walter T. Schmid, Vernon L. Scott, Philip K. Shriver, Henry M. Sparger, Roderick M. Stewart, Earl R. Stone, Jr., Richard C. Suehr, Euel A. Travis, Alden N. Wood, James L. Yelvington (Also Purple Heart). **MASTER SERGEANTS:** Thomas J. Crumley, William F. Myers. **TECHNICAL SERGEANTS:** Walter V. Check, James F. Shoup. **STAFF SERGEANTS:** Norman K. Frost (Also Purple Heart), William T. Jent, George A. Kielbasa (Also Purple Heart), John E. Lillback, John J. Meehan, Donald T. Ostlund (Also Purple Heart), Burnell Walker. **SERGEANTS:** Charlie Barnes, A. G. Blackwelder, Jr., Robert H. Burns (Also Distinguished Flying Cross), Calvin W. Croom, Lewis DeSimone (Also Distinguished Flying Cross), Perry Doty, Alfred H. Fawe, Ray D. Holcomb, Kenneth L. House, Daniel J. Keller, Henry P. McNeill, Jr., James W. Miller, Guy E. Reynolds, Thomas E. Ross*, John R. Walker. **CORPORALS:** Francis R. Neis, Albert F. Osterhaus, Robert D. Smith, George R. Zenz. **PRIVATE FIRST CLASS** Mack B. Anderson. **PRIVATES:** Wiley O. Cart, Otto Russell.

Oak Leaf Cluster to Silver Star

CAPTAINS: John Herbert Posten, Robert E. Thacker. **LIEUTENANTS:** Feaster A Norwood, Adrian J. Sampeck, Edward R. Yerington. **TECHNICAL SERGEANT** Bernardino O. Tortora. **SERGEANTS:** Claude J. Fraley, Regis D. Weinfurther.

* Posthumous

Sure, we said pass it on, but that's sticking your neck out a bit too far. We don't recommend it. But we do recommend—when it's safe—passing AIR FORCE on as soon as you've read it. By sharing a copy with as many men as possible, you will give everyone at your station an opportunity to read the official service journal.

William J. Brownlee, Concetto Castagna, Jr. (Also Air Medal), Frank B. Cooper*, Richard L. Coster, Phillip A. Cratch, Charles R. Deeter, Robert C. Duff, Jr.*, Lyle O. Edwards, Arnold E. Field*, Archie R. Gurkin, Guy H. Hand, Alfred Hays, Earl A. Hood*, Charles L. Hrusecky*, Joseph H. Jencuis*, John W. LaBar, Jr.*, Daniel Powloski, Allan G. Rae*, Michael V. Repko, Bertram J. Robas, Stanley J. Rykulski, Paul L. Staton*, James E. Strickland*, Ernest M. Walker, Jr.*, Robert H. Westbrook, Jr.*

Oak Leaf Cluster to Purple Heart

PRIVATES FIRST CLASS: Charles J. Correll, Morris Moskowitz.

DISTINGUISHED FLYING CROSS

LIEUTENANT GENERALS: Frank M. Andrews, Delos C. Emmons, George C. Kenney. **MAJOR GENERALS:** Ralph Royce, Clarence L. Tinker*. **BRIGADIER GENERAL** Joseph H. Atkinson. **COLONELS:** George F. McGuire, Charles B. Overacker, Jr. **LIEUTENANT COLONEL** Paul F. Davis. **MAJORS:** Albert J. Baumler (Also Air Medal), John D. Bridges, Russel A. Cone, James R. Dubose, Ben I. Funk, Cecil S. McFarland, Robert J. Mason, Paul H. Payne (Also Air Medal with Oak Leaf Cluster), Joseph A. Thomas (Also Air Medal). **CAPTAINS:** Frederick L. Andrews, Warren A. Beth, Bert M. Carleton, John W. Carpenter 3d (With Oak Leaf Cluster), John W. Fields, Vernon F. Newton, Richard D. Salter. **LIEUTENANTS:** Lester M. Chancellor, John J. Cook*, Dan M. Erickson*, Lawrence Gardner, James A. Gibb, Jr., Edward H. Higgins, Harvey Dalton Johnson*, Kenneth C. Jones, Richard W. Kimball, Hubert Smith Mobley (With Oak Leaf Cluster), James L. Regan, Francis X. Schwarzenbek. **TECHNICAL SERGEANTS:** David G. Dixon, James A. McVicar, Joseph H. Marling. **STAFF SERGEANTS:** Fred S. Croyle, Paul H. Dortch (With Oak Leaf Cluster), Orin W. Hawkins (Also Oak Leaf Cluster to Silver Star), Douglas H. Logan, Henry B. Pecher, Roscoe P. Rogers, Nicholas V. Stashuk (With Oak Leaf Cluster), Sam Tower, Jack L. Woody. **SERGEANTS:** Sheldon D. Beaton, Carl M. Biehn, Dan Ehrheart, James R. Mathewson, Robert K. Palmer, Elwyn O. Rahier, Lloyd D. Whipp, John J. Wilfley. **CORPORALS:** Harold E. Guse, Henry C. Nosalik, John A. Straight, Jr. (With Oak Leaf Cluster). **PRIVATES FIRST CLASS:** Floyd E. Marshall, Herbert M. Wheatley, Jr.

Oak Leaf Cluster to Distinguished Flying Cross

LIEUTENANTS: Theodore J. Boselli (Second Oak Leaf Cluster), Carl E. Epperson. **STAFF SERGEANTS:** John F. Clark, John C. Haddow.

SOLDIER'S MEDAL

LIEUTENANTS: Frederick R. Beal, Fred W. Edwards, James A. Estes. **STAFF SERGEANTS:** George B. Kirkpatrick, Rodney M. Stone. **SERGEANTS:** Elvin M. Lee, Gordon F. Willis. **CORPORALS:** Henry M. Thomas, Eugene B. Thompson, Jr. **PRIVATE FIRST CLASS** Robert J. Meikle. **PRIVATES:** John F. Hayes, Ivey I. Oakley, Wilbur R. Perkins, Emil R. Popovitch.

AIR MEDAL

MAJOR GENERAL James H. Doolittle. **BRIGADIER GENERAL** Caleb V. Haynes. **COLONELS:** James E. Briggs, Robert Oswald Cork, Emmett O'Donnell, Jr., Stanley T. Wray. **LIEUTENANT COLONEL** Jack N. Donohew. **MAJORS:** Rudolph E. Flack, Kenneth H. Gibson, Isaac J. Haviland, Jr., Gregory F. Keenan, William A. Lanford, Walter Y. Lucas (With Oak Leaf Cluster. Also Oak Leaf Cluster to Silver Star and Two Oak Leaf Clusters to Distinguished Flying Cross), Paul W. Tibbets, Jr. (With Oak Leaf Cluster), James W. Wilson, Victor S. Zienowicz. **CAPTAINS:** Virgil C. Alleman, Pat Martin DeBerry, Howard Bowman, Donald S. Dunlap, John D. Eiland, Jr., Richard F. Ezzard, Ernest G. Ford, George W. Gillett, R. C. Lycan, Phillip A. Sykes, Edward F. Tindall, John M. Yancey. **LIEUTENANTS:** Joseph D. Abell, Kenneth W. Ambrose (With Oak Leaf Cluster), Stanley M. M. Anderson, Gene L. Arth, Robert D. Bailin, David F. Barnett, Jr., Harold E. Blanksma, John J. Boll, Elsie S. Ott, William Hughes Young. **WARRANT OFFICER** Lester R. Dowell. **MASTER SERGEANTS:** Edward Maciag, John G. Yates. **FIRST SERGEANT** Bernard I. French. **TECHNICAL SERGEANTS:** Herbert B. Daly, Walter A. Gilbert, Jarvis E. Hall, Stanton E. Hendricks, Stanley C. Jackola, John M. Lambert, Charles Y. MacPherson, Edgar A. McCunney, Karl L. Masters, Michael J. Morrissey, Aaron F. Moses, Robert G. Mumaw, William L. Nisbett, Arvle D. Sirmans, Earle K. Smith, Richard L. Walker, Pete T. Zychal. **STAFF SERGEANTS:** Walter S. Ahrens, Frank L. Batterson, Clair K. Benser, Jack Craig Boyd, Earl J. Deroche, William H. Forrester, Roy H. Gibson, Braden C. Griffin, Conrad A. Handon, James M. Hobbs, Arthur B. Smith, Francis Sulcofski, Lucius W. Treat, Douglas J. Upton, Lewis C. Williams, William E. Williams, J. L. Wiseman. **SERGEANTS:** Alfred Armand, Amos H. Behl, Lorin E. Blanchard, James R. Boyd (With Oak Leaf Cluster), Chester D. Cahill, Stephen M. Cooper, Joseph F. Cummings, Jack F. Delaney, Abraham A. Ehrenreich, William T. Majewski, Lee E. Nelson, Richard A. Williams (With Oak Leaf Cluster), Howard V. Wilpur. **CORPORALS:** Grady W. Anglin, Arthur G. Campbell, Earl A. Hollar, Jack E. Leverone, Frank A. Licordari, Stanley S. Seger, Lester A. Smith, Werner G. Wallace, Elbert C. Wright. **PRIVATES FIRST CLASS:** Eugene Burchard, Robert L. Parks, Glenn C. Richards, Charles H. Torrence, Jack L. Warren. **PRIVATES:** John M. Bowden, Ivan W. Graves, Lloyd D. Moran, Henry J. Schloer, Lloyd A. Shinn, Claude R. Taylor, William H. Yoakum.

*Posthumous

PICTURE CREDITS

8: AFSAT, Orlando, Fla. 14-15-16: Sacramento Air Depot; Hendricks Field, Fla.; AAFTTC. 17: Consolidated Aircraft Corp. 18-19: Major Stephen L. Gumport. 22: Air Service Command, Patterson Field, Ohio, 25: AIR FORCE. 30: Associated Press. All other photographs secured through official Army Air Forces sources.

ANSWERS TO QUIZ

on page 17

1. (b.) Insufficiency of oxygen
2. (b.) To one side of it
3. (b.) 30 inches
4. (d.) Cloud formation
5. (d.) A central instructors' school
6. B-24
7. (b.) Micrometer
8. (c.) 45 degrees
9. (b.) False
10. (c.) In arterial bleeding the blood spurts from the artery with each pulsation of the heart; bright red in color. (Blood from the veins flows in a steady stream; dark red or purple. Capillary bleeding is an oozing of blood from a cut surface.)
11. (a.) In front of the engine
12. (c.) $10,000
13. (d.) I sustain the wings
14. The Air Medal
15. (d.) Ultramarine blue piped with golden orange are the Air Forces colors. (Cobalt blue piped with golden yellow—Chemical Warfare Service; dark blue piped with white—Judge Advocate General; dark blue piped with light blue—Inspector General Department.)
16. (b.) False
17. (b.) North on the ground
18. (a.) Charge of Quarters
    (b.) Army Post Office
    (c.) Bachelor Officers Quarters
    (d.) Officers Candidate School
19. (c.) Compass
20. B-25

HIGH LEVEL JUMPING

(Continued from Page 13)

available. Since the walk-around cylinder can be used without removal of the oxygen mask, it is in some ways superior to the bail-out bottle in the case of emergency. It could be employed at least up to the point of clearing the ship.

Even with this emergency equipment, however, free fall still remains one of the best answers in parachute escape from high altitudes. The accompanying chart shows the comparative rate of descent between free fall and open parachute fall. It is readily seen that an airman's exposure to low oxygen tensions and extreme cold of higher altitudes is drastically shortened if free fall is employed until he reaches lower levels.

Simulated free-fall parachute descents in a low-pressure chamber have shown that descent from 40,000 feet can be carried out without loss of consciousness or use of any oxygen equipment, if a deep breath of oxygen is taken prior to the start of the fall and held for as long as thirty seconds.

If this provision is not met, a brief span of unconsciousness will result. This period of unconsciousness is very short and, except in the case of an injured man, it is believed that recovery can be made in plenty of time to allow for the opening of the parachute. In fact, most flyers probably wouldn't recognize that they had had a lapse of consciousness due to lack of oxygen.

In a series of laboratory tests at Wright Field in which the conditions of loss of consciousness at altitudes of from 30,000 to 36,000 feet were simulated, the subjects "free fell" and all recovered sufficiently to pull the rip cord between 2,200 and 25,000 feet. The average pull was made at 14,000 feet.

The effect of free fall on the ears is great and rupture of the eardrums may occur unless the parachutist is able easily and readily to clear his ears. Still, the danger of rupture is not so great if free fall is employed only at higher altitudes and is stopped by opening the chute at about 15,000 feet. Moreover, it should be borne in mind that although they are painful and temporarily incapacitating as far as flying is concerned, the prospect of ruptured eardrums should not be given too much consideration when an emergency parachute escape is involved.

Aside from its tendency to forestall loss of consciousness in high altitude escapes and the protection it affords from quick-triggered adversaries, the free-fall procedure has other advantages. In leaving a high-speed fighter plane, the pilot may experience difficulty in getting out and the speed imparted to the falling body may snap the parachute shrouds if the chute is opened too soon. Free fall should be employed in such cases until the velocity imparted by the plane is materially lessened. This, of course, is dependent on the altitude at which the pilot has bailed out. It is recommended, whenever possible, that fighters be pulled almost to a stall before pilots leave them.

Then, too, there is always the danger of the parachute becoming fouled with the falling plane if it is opened too soon. Here again, common sense must be exercised.

There is at least one case on record where even the exercise of good common sense on the part of the pilot almost failed to separate his free-falling body from the falling aircraft in time to permit the safe opening of his chute.

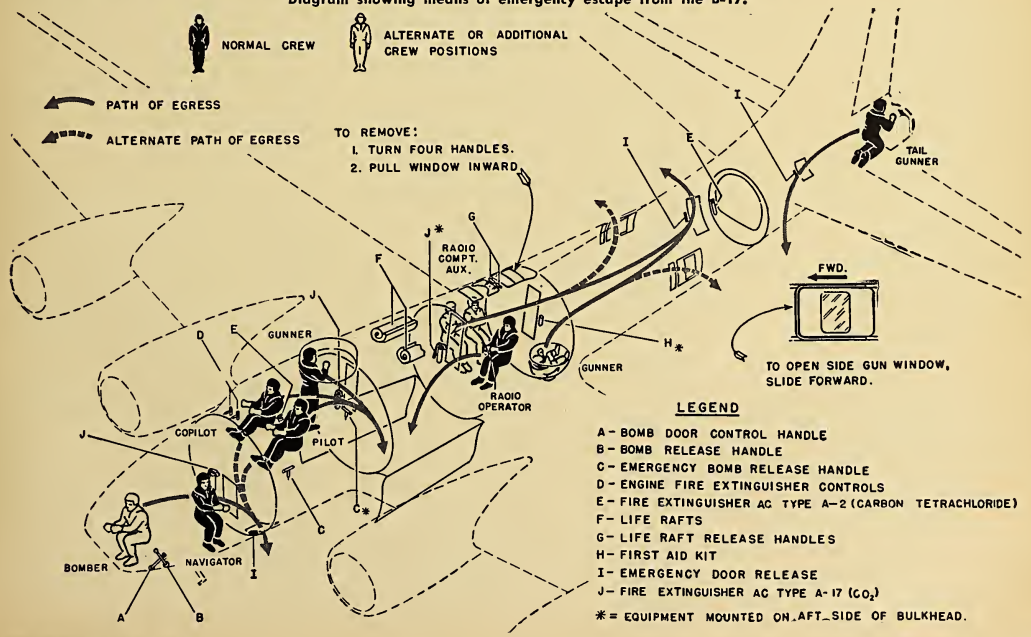
In this case a fighter plane went into a spin, completely out of control. The pilot decided to abandon the ship and attempted to crawl out on one wing so he would be thrown clear. He pulled himself a few feet along the wing surface and slipped off.

Seconds later with plane and pilot at about 3,000 feet, a portion of the whirling plane struck him on the side of the head and scraped some skin from his back. Although he feared he might lose consciousness, the pilot wouldn't open his chute because the falling plane was still above him.

The plane was still above the pilot at 1,200 feet but he decided it was about time to check on the chute. He felt for it but it wasn't there. He fumbled for the chute and found it tangled around his ankles. The chute had been knocked down by the impact of the plane.

By the time the pilot had his chute under control, he had dropped to about 600 feet. But the plane was still overhead. Nevertheless, his one chance was to pull the rip cord and cross his fingers. The parachute responded immediately, although in opening it bounced off one wing of the falling plane. The fabric was ripped a bit in the collision but the pilot landed safely. It was a rather rough initiation into the Caterpillar Club, but it goes to show that a lot can happen after a bail-out and still find you alive to tell about it. ☆

Diagram showing means of emergency escape from the B-17.



PREPARE FOR TROUBLE!

Your knowledge of emergency equipment can mean the difference between life and death.

PREPARED BY THE ARCTIC, DESERT AND TROPIC INFORMATION CENTER, EGLIN FIELD, FLORIDA

It is the function of the Arctic, Desert and Tropic Information Center (Headquarters at Eglin Field, Florida) to prepare and disseminate information on all aspects of Air Forces operations (maintenance, health, shelter, clothing, etc.) in non-temperate zones. Information on forced landing procedures, survival and Emergency Kits is a major interest of this organization. The ADTI Center welcomes inquiries from all branches of the Air Forces, concerning problems relating to operations in Arctic, Desert and Tropic areas.

SPECIALIZED studies in the technique of forced landing procedure and survival in non-temperate zones, made by the Arctic, Desert and Tropic Information Center of the AAF, reveal that an all-important factor in survival is the proper selection and use of Emergency Kits. It is the purpose of this discussion to present the picture of Emergency Kits as it currently exists.

Air Forces Emergency Kits have been designed and assembled by the Materiel Command to fit the special needs dictated by the character of the flight and the type of terrain over which it is made. Because the decision as to what type of emergency equipment is to be carried rests eventually with the individual pilot and crew, it is to the interest of all flying personnel to know what emergency equipment is available.

To begin with, it will pay to learn and practice these three cardinal principles:

➤ Select the Emergency Equipment you intend to carry on the basis of the nature and requirements of your mission, as well as on the weight and space allowance of the aircraft. Consider all the factors: whether you will operate over water, whether you may be forced down in enemy territory, etc.

➤ Check the equipment carefully before your takeoff. Understand its use. See that it's all there. Test it to make sure it will work when you need it.

➤ Keep your emergency equipment readily accessible (strap on the kits intended for carrying on your person); keep the other kits within reach, where you can put your hands on them instantly in an emergency.

Let's look over the Emergency Equipment set-up. At present, there are three main categories available. They include:

1. *First-Aid Kits.* These include emergency medical first-aid equipment. Two such kits are available—see descriptions below.

2. *Flotation Equipment.* This equipment is carried in aircraft for use in the event of emergency on overwater flights. It includes a pneumatic life preserver vest and a variety of life rafts—see descriptions below.

3. *Sustenance and Implement Kits.* These kits fall into four groups: (a) parachute back- or seat-pad Emergency Kits; (b) Personal Kits—these are attachable to, or can be carried on the person of pilots and crew members; (c) Airplane Kits which are carried in the aircraft; and (d) Dropping Kits transported by plane to the disaster—see description below.

The chart which accompanies this article indicates the Emergency Equipment and Kits currently available, and shows the zones and purposes for which they are intended. Detailed descriptions of the current Emergency Equipment follow:

FIRST-AID EQUIPMENT

First-Aid Kit, Aeronautic: Installed in all aircraft, based on the use of one kit for each two men. Components: surgical dressing, sulfanilamide powder, sulfadiazone ointment (for burns), syrettes morphine tartrate (hypodermic to relieve severe pain), scissors, adhesive bandages and iodine swabs for care of minor wounds.

First-Aid Kit, Parachute: A compact package that is either tied to the chute harness or carried in the pocket. Components: dressing for wounds, syrettes, tourniquet.

FLOTATION EQUIPMENT

The "Mae West": A pneumatic life preserver vest, well-known to all personnel.

Pneumatic Life Rafts: Six types are currently in use by the Army Air Forces—*Type A-2* (1,000 pound capacity), *Type A-3* (1,000 pound capacity), *Type B-3* (500 pound capacity), *Type B-4* (500 pound capacity), *Type C-1* (250 pound capacity), and the One-man Parachute-type Pneumatic Life Raft.

Types A-3, B-3, B-4, and C-1 are of an early design and are being superseded by types A-3 and the One-man Parachute Rafts. The *A-3 Raft* is used on all airplanes having crews of more than three men. Crews of 4-5 men use one A-3 raft; crews of 6-12 men use two A-3 rafts; crews of 12-15 men use three A-3 rafts. The Type A-3 five-man pneumatic life raft is designed for storage in the raft compartment of airplanes. It can be automatically inflated by means of control cable, hand releases, or manually by release cords. The following accessories are included in secured pockets and containers:

pyrotechnic pistol and distress signals, seven 12-ounce cans of water, three sea markers, flashlight, scout knife, police whistle, first-aid kit, two emergency fishing kits, shade and camouflage cloth, combination signal, watercatching and sail cloth, two oars, hand pump and hose, bailing bucket, repair kit, four bullet-hole plugs, 40 feet of cotton cord. The container also has provision for housing radio apparatus.

The One-Man Parachute Raft is designed to supplement the seat-type or back-type parachute, and occupies whichever position is free. The raft is automatically inflated in a few seconds by a carbon dioxide infiltration cylinder when the attachment cord is pulled. The One-man Raft is equipped with a sea-anchor, a bailing cup, two hand paddles, a first-aid kit, a can of drinking water, two bullet-hole plugs, patching material, a can of fluorescein dye (to be spread on the water as a distress signal marker), a waterproof cloth (for use as a shade cloth, water-catching, signal, sail, or camouflage cover).

Sustenance and Implement Kits

Alaskan Emergency Kit, Type B-1. For personnel flying in the north. A back-pad kit designed to take the place of the conventional back pad on the parachute. Contents: cooking kit, match case, emergency rations, gloves, mosquito headnet, pocket knife, fishing equipment, insect repellent, bouillon cubes, and camphor gum.

Jungle Emergency Kit, Type B-2. For personnel flying in the tropics. A back-pad kit designed to replace the conventional back pad on the parachute. Contents: compass, emergency rations, match case, flare, gloves, mosquito headnet, machete, sharpening stone, fishing equipment, insect repellent, and first-aid kit.

Basic Parachute Emergency Kit, Type B-4. This kit, designed for both Arctic and tropic use, will replace the B-1 and B-2 kits when the present supply of those kits is exhausted. Consists of a seat or back-pad type kit, approximately 15 inches by 13 inches; has felt inset with cutouts for holding components; enclosed in a zipper-fastened canvas cover. A one-inch thick pad serves as a cushion. The kit may be used as a knapsack after landing. Contents: signal flares, machete, signal panel, special parachute kit ration unit made up of Field Ration "K" components, match case with matches, cooking pan, compass, pocket knife, fishing kit, can of solid fuel, first-aid kit, mosquito headnet, goggles, and gloves.

Personal Kits

Emergency Sustenance Kit (Escape) Type E-3. Designed to be carried in the pocket and used when forced to bail-out over enemy territory. Packed in cloth bag, twelve inches by 6 inches (may be used later as a water container). Contents: matches, compass, hacksaw blade, halazone tablets, benzedrine tablets, Field Ration "D", dextrose tablets, bouillon powder, chewing gum.

Emergency Sustenance Kit (Individual Bail-out Rations) Type E-6. Supplies additional rations; can be snapped on chute harness before bailing out. Contents: two units of Field Ration "K".

Emergency Sustenance Kit (Individual Bail-out Water) Type E-7. Provides two cans of drinking water (boiled and pasteurized) to be snapped on chute harness.

Airplane Kits

Emergency Sustenance Kit (Rations) Type E-1. Intended to provide rations and miscellaneous equipment for flying personnel in northern climates. One kit is carried for each two men in the crew. Packed in a fibrepax drum, 11½ inches by 19 inches. Contents: U. S. Army Mountain Rations, drinking water in two-pint cans, match box and matches, hunting knife, mess kit, mosquito headnet, mosquito repellent, canvas gloves, Mukluks, ice crampons, solid fuel and grill, sewing kit, and FM 31-15.

Emergency Sustenance Kit (Implements) Type E-2. Intended to supply the necessary implements for use in northern climates. Housed in a metal container which will also serve as a wood stove. (Designed for use with food components of the Type E-1 kit.) Contents: combination .22 caliber and .410 gage gun, ammunition, matches in match box, camphor (Continued on Page 38)

ARMY AIR FORCES EMERGENCY EQUIPMENT AND KITS

TYPES OF KITS	ARCTIC	DESERT	TROPIC	OVERWATER
FIRST-AID	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness
FLOTATION	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories
BASIC	B-4 BASIC PARACHUTE KIT Seat or back-pad type*	B-4 BASIC PARACHUTE KIT Seat or back-pad type*	B-4 BASIC PARACHUTE KIT Seat or back-pad type*	B-4 BASIC PARACHUTE KIT Seat or back-pad type*
PERSONAL	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER
AIRPLANE	E-1 ARCTIC RATIONS E-2 ARCTIC IMPLEMENTS E-4 COOKING UNIT	E-8 DESERT IMPLEMENTS E-9 DESERT RATIONS E-4 COOKING UNIT	E-8 TROPIC IMPLEMENTS E-9 TROPIC RATIONS E-4 COOKING UNIT	E-5 OVERWATER IMPLEMENTS AND RATIONS E-9 RATIONS
DROPPING	E-12 ARCTIC AERIAL DELIVERY KIT Rations, shelter, clothing, etc.	E-10 DESERT-TROPIC AERIAL DELIVERY KIT Rations, shelter, implements	E-10 DESERT-TROPIC AERIAL DELIVERY KIT Rations, shelter, implements	E-11 OVERWATER AERIAL DELIVERY KIT Rations, implements

*B-1 and B-2 kits will be used until present supply is exhausted.

AERIAL TORPEDO Attack

By Captain J. P. Muri

TORPEDO attack is a difficult form of aerial warfare.

There is the torpedo itself. When operating with regular bombs against land targets, you can generally utilize every virtue of your airplane—its speed, ceiling, maneuverability and so on. You can plan the attack on the basis of your aircraft's particular abilities.

But the torpedo is an involved mechanism. It has certain characteristics which govern the manner and speed and height of its launching if a high probability of success is to be assured. Thus, your flying technique must be suited principally to the projectile, rather than the plane.

The enemy, familiar with these characteristics, knows just about how you will attack.

Torpedoes of all nations are similar. Naturally, the technique of launching them from aircraft is similar the world over—except for minor variations. Commanders of enemy warships are thoroughly schooled in such knowledge. Aware of the altitudes and distances from which torpedoes may be effectively released, they can plan their own gunnery fire and other protective measures accordingly.

Lastly, you must outwit a moving target. This requires, above all, an exhaustive knowledge of the enemy. You must be able to recognize quickly the type of ship you are attacking and to know its possible speed, type of armament, weaknesses of armor and other data. For it is such things which should determine your own approach and getaway.

Despite these difficulties, the air-launched torpedo has demonstrated itself to be one of the war's deadliest weapons.

A torpedo hits big ships where they are most vulnerable, below the waterline, and where the force of the explosion is confined and concentrated.

Incidentally, this article concerns only torpedo attack by land-based aircraft—principally medium bombers. No attempt will be made to describe the tactics and training of Navy fliers equipped with seaborne planes. It should be borne in mind that various means are employed to diversify the enemy's protective fire and thereby assure a greater degree of fatal damage to him.

The modern torpedo is a self-propelled, self-controlled underwater missile with a heavy explosive charge. It is about 13½ feet long, over 20 inches in diameter, weighs approximately 2,000 pounds, carries TNT in the nose, or "warhead," will travel long distances, will find and hold a pre-set depth, and will maintain accurately the course upon which it is launched or may be adjusted so as to start on that course and later turn on a pre-determined angle for purposes of deception.

A TORPEDO has four main sections—warhead, airflask, afterbody and tail.

The warhead, made of thin reinforced steel or bronze shell, carries the explosive, a detonator and a mechanism which renders the charge harmless until the torpedo has run a few seconds.

Back of this is the airflask. Made of high alloy steel, it carries a sufficient supply of air to support combustion. Ends of the airflask are closed with steel bulkheads. Behind the aft bulkhead is a section to hold water and fuel.

In the afterbody are situated the turbines and controlling instruments of the torpedo.

In the tail are mounted rudders, counter-rotating propellers, vertical and horizontal stabilizers.

When a torpedo is dropped air pressure from the flask opens starting valves, air is released into a combustion pot, fuel is forced into the combustion pot by a stream of air while still another jet strikes a cap on an igniter, causing it to burn.

Thus, in a combustion chamber there is flame, air, and a spray of fuel. Resulting gases are forced through nozzles to a pair of turbines mounted on concentric shafts. After imparting their energy the gases pass out through the tail to the sea, making the characteristic parallel wake of the torpedo. The turbine wheels drive propellers which, in turn, drive the projectile through the water.

Obviously, with such a fine mechanism, the manner of launching becomes the all-important factor in an attack.

The depth at which you want the torpedo to travel is determined beforehand and an instrument setting made. Should your target call for a different setting, this can be accomplished from within the plane while flying. The direction in which the torpedo should travel is governed by a special sight.

In launching a torpedo, there is a vital matter known as the "entrance angle."

When a torpedo is dropped correctly, you will see a white circle on the water, then a straight white line like a piece of string being drawn across a blackboard. This means that gyros, rudders and depth controls are operating properly.

But frequently a torpedo will "porpoise"—that is, skip sharply right or left or even out of the water for several yards. This can occur because of a too shallow depth setting or, more often, because of a bad entrance. Usually, the gyro will correct a "porpoise" and return the projectile to its pre-set course but this variation of twenty-five yards or so may result in a miss fore or aft of your target. If the entrance has been really bad, the torpedo may even sink.

There is only one answer to the entrance problem—proper flying.

Experience has shown that the best torpedo entrances are made when a plane is flying absolutely straight and level at an altitude depending directly on the plane's speeds.

It is apparent that, with a land plane, one of the chief problems is to slow down. And to slow down without becoming too much of a "sitting duck" target.

To carry out an attack of this sort, it is clear that a rugged airplane with good evasive action and protective guns is required.

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

The Commanding Officer of an AAF torpedo squadron describes the use of one of the war's most deadly weapons

Torpedo tactics as taught now are a far cry from the instruction earlier in the war. When we went out at Midway we had had four days practice in torpedo work. About all we knew was to come in toward the bow of a ship, to duck and dodge, and to keep out of crossfire. We ran into about 40 ships and there was no remote hope of keeping out of crossfire.

A lot has been learned since then, however, and the experience of pilots from the Aleutians to the Solomons is embraced in the training course now given.

The course naturally consists of both lectures and practice. First, flight crews are given extensive information about the torpedo itself—what it can do, what kind of missions it should be used on, its mechanical operation.

From this they go on to study the technique of dropping, the principles and procedures of torpedo runs, and ship structure and identification. Then comes the tactical details—how to take evasive action; how to attack; how to change formation; how to take advantage of weather and natural elements, such as making dawn and dusk approaches, keeping darkness or coastline hills in the background to minimize detection, and so forth.

DURING the course, much attention is given to dry runs in a hangar with a machine that simulates flying, like a Link Trainer. This battery-operated device is mathematically set up with sights allowing for distance, altitude, and other factors. On this machine, bomber crews learn the all-important knack of "leading the target," a process similar to shooting skeet and, in torpedo work, quite as essential to success.

Following instruction of this nature comes actual flying over water. There are many hours of straight formation flying at low altitudes — legalized "buzzing" — so that crews can learn the very difficult art of estimating distance on water and get accustomed to certain other problems, for example, the general inaccuracy of altimeters in low, over-water flight.

Then there are camera runs on targets, with the camera revealing the angle from which an attack was made, the distance and altitude of the drop, and the probability of a hit or miss.

Lastly, there are actual runs on a target boat with dummy torpedoes. These projectiles are the same weight and size as regular torpedoes, the only difference being that the warhead is loaded with water instead of TNT.

To supply this latter form of training, the training base maintains an 83-foot, speedy target boat and a diving outfit with the function of retrieving all torpedoes. Operations of these Army "sailors" provides bomber crews with the most realistic torpedo practice possible. ☆

ANGELS DON'T SHOOT GUNS

(Continued from Page 12)

stubborn .50 caliber. "I can shoot them damn Jerries down with one gun just as well as two. I'll even go up without any guns."

Shorty and his guns went, of course, and before they reached France both guns were working. On the way in the bombardier spotted two FW-190s coming in head-on and called out the direction of the attack.

"I turned my turret to the front and raised my guns," Shorty says. "Then Lieutenant Cunningham pulled up the nose so I could get at them and there was an FW about 100 feet away. His wings looked like they were on fire because all his guns were going at once. I thought I was a goner then but I got in a quick burst. He flipped over as he went past. I tried to swing after him and get in another burst but he was going too fast. He was only 50 feet away and I got a glimpse of the pilot in the cockpit.

"He was wearing goggles and a leather mask over his face. He was looking at me and I was looking at him. That's all there was to it. But I was damned scared at the moment."

Shorty Gordon went cold all over in that split second he was looking into the eyes of the enemy. But it was a thrill. It was what he had joined the U. S. Army Air Forces for. It was that sort of excitement he craved when he was risking his neck as a "gow" driver back on the flat desert race tracks of his sunny California, roaring along behind the wheel of a souped-up little Model A. It was the kind of adventure he had hoped to find as a gunner in the RCAF before the U. S. got into the war, but the recruiting officer told him he was one inch too short for the job.

Shorty had doubted whether he could find excitement in the U. S. Army Air Forces because his country was then at peace. But he took a chance on it October 22, 1940, at Fort MacArthur, California, and got into the 9th squadron of the 7th Bombardment group.

When the 7th left Salt Lake City for foreign service in November 1941, Shorty was left behind—in the guard house. An MP had accused him of being improperly dressed, and Shorty, with his love for casual dress—and fighting—had . . . well, three months at hard labor didn't dim his appetite for the Air Forces. In fact, Shorty claims he had a wonderful time in the guard house, especially after he became a parole prisoner and was free to carry on a lucrative little beverage trade with the Sergeant of the Guard.

On the last day of his sentence he was planning to ask for a transfer to the Philippines. From there he intended to hop to Burma and join up with the Flying Tigers as a ground man. But on that day he heard about Pearl Harbor. That was all he wanted. He got into the first heavy bombardment group he could find, left his job as an armorer to take up gunnery, and found himself between a pair of fifties in the ball turret.

So now he's over German-occupied Europe, spinning his turret and searching forward . . .

This is not all there is to the story of a ball turret on a Flying Fortress. Nor is it much of a piece on that bloodthirsty, thrill-seeking, iron-gutted, lovable little man whom you may now be calling a devil, or a hero. Unless you have been squeezed into a small glass ball for four or five hours at 20,000 feet, it's hard to understand what happens when the cold and the cramps and the fighters set in.

Some ball turret gunners will tell you of the time the door on the turret opened and left them literally hanging on to their guns against a 160-mile-an-hour wind.

Others may tell of the discomfort of the electric suit when it gathers up in a fold on their groin and blisters them with heat. The heat makes them urinate, and that freezes their clothes to the turret so they couldn't fall out even if they wanted to.

They'll tell you of that sickening feeling that comes when your guns freeze up, or jam, and you have to stay in the turret, turning the useless weapons at the fighters to make them think you're still in action.

And some will tell you of their pals, bunk dreaming, who see fighters coming at them, with wings afire, and flak bursting around so thick you can walk on it . . .

It's a good thing that all gunners tell each other they're "flak happy". Because joking about it eases the strain.

Shorty Gordon eases his nerves after a mission by taking a triple Scotch, "and more if I can get it."

Then he might go off on a 48-hour pass to see his girl. The one he's going to marry after that 25th mission. ☆

Since this story was written, Shorty Gordon has been reported missing from a raid on Germany. Crews in other ships of his formation saw his Fortress go down, one white parachute billowing out above the plane. Shorty was wearing his chute on that trip. They believe the one they saw was his.

PREPARE FOR TROUBLE!

(Continued from Page 35)

cubes, generator-operated flashlight, candles, compass, frying pan, stew pan, large spoon, butcher knife, cooking oil, machete, fishing kit, and signal flares.

Emergency Sustenance Kit (Cooking) Type E-4. An emergency cooking unit employing a pressure type gasoline stove burning 100 octane gasoline. Includes: two stew pans, frying pan, fabric gasoline bag.

Emergency Sustenance Kit (Overwater) Type E-5. Designed for carrying in large aircraft operating mainly over water. Contents: Field Ration "K", drinking water in cans, flashlight, compass, matches, knife, hand-axe, mirror, candles, fishing kit, flares, paulin, bailing bucket, sea markers, rope, tomato juice. This kit is used in addition to the kit supplied in the life raft.

Emergency Sustenance Kit (Desert and Tropic Implements) Type E-8. For desert and jungle use. Contents: combination .22 caliber and .410 gage gun, ammunition, generator flashlight, machete and sheath, flares, paulin, mirror, first-aid kit, sewing kit, soap, and sunburn ointment.

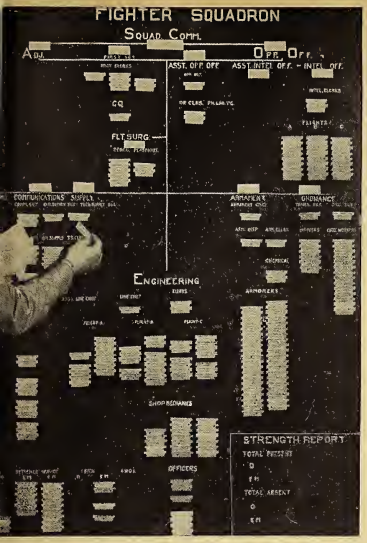
Emergency Sustenance Kit (Desert and Ocean Rations) Type E-9. Contains the necessary rations for desert, jungle and ocean emergencies. Contents: drinking water in cans, Field Ration "K", paulin, and sun hats.

Dropping Kits

Emergency Sustenance Kit (Tropical Aerial Delivery) Type E-10. Intended for use in tropical areas for dropping the necessary rations and equipment to aircraft personnel stranded in the desert or jungle. Contents: Field Ration "K", drinking water in cans, tent, sun hat, neckerchief, paulin, solid fuel and grill, insect repellent, generator flashlight, mirror, flares, combination .22 caliber and .410 gage gun, ammunition, scout knife, compass, sewing kit, machete and sheath, atabrine tablets, benzedrine sulphate tablets, soap, tea tablets, matches, and sunburn ointment.

Emergency Sustenance Kit (Shipwreck) Type E-11. Designed for carrying in patrol planes. Intended to offer temporary relief, pending rescue, to victims of a disaster at sea. Packed in a free-falling container. Contents: drinking water in cans, Field Ration "K", Very pistol, matches, heat pads, first-aid kit, sea markers, police whistle, bailing cup, flares, sponge, mirror, fishing kit, knife, water bag, paulin, compass, blankets, cloth helmets, channel swimmers' grease.

Emergency Sustenance Kit (Arctic Aerial Delivery) Type E-12. Intended for use on the Greenland Ice Cap and in similar desolate Arctic areas. Designed for dropping by parachute to help sustain life of stranded aircraft personnel until rescue arrives. Contents: 2 parkas and 2 trousers, 2 sleeping bags, 2 one-man tents, pneumatic mattress, gasoline stove, 2 one-gallon gasoline containers, ice saw, ice-axe, 2 pairs crampons, intrenching shovel, goggles, 4 pairs mittens, 6 pairs socks, 2 pairs wristlets, 2 mufflers, Type E-1 Ration Kit, and Type E-2 Implement Kit. Implements and rations are dropped in a chute container; clothing, sleeping bags, etc., are free-falling. ☆



A squad board simplifies the morning report.

PRIVATE X enters the squadron orderly room. He salutes smartly. On the desk of the personnel officer lie his service record and AGO Form 20. They have been carefully scrutinized to determine his fitness for classification and duty assignment.

"Did you ask to be trained for the job of teletypewriter operator?"

"No, sir", he replies, "I'd like to be in the kitchen cooking. I used to be a butcher and a cook." (Form 20 corroborates this.)

He is asked why he was sent from group headquarters as a TWX operator.

"They needed one, sir. So they told me I was to learn operating", he reveals.

Further examination shows him to be valuable as a cook, less so as a TWX operator. Fortunately, one of the present cooks is classified as limited service, awaiting transfer. Private X is placed in the mess hall under supervision. The mess sergeant reports favorably on his work. Obviously the right thing to do is to recommend him for reclassification as a cook to the base reclassification board, transfer the limited service overage, and everybody is happy.

But suppose he had not been reclassified. Then he would have been like hundreds of others who pass through the Army Air Forces groups every month, shuttling back and forth between feeder and combat units until they find the right spot.

More than the other arms and services, the Army Air Forces is composed of individual specialists, making more complex its problems of personnel. A single fighter squadron like ours contains sixty different types of specialists ranging from the commanding officer down to the lowest basic. This, in a unit of less than 275, places a heavy premium on the proper classification

A study of personnel problems and techniques in the Army Air Forces.

THIS QUESTION OF MANPOWER

By
Lieut. Matthew Huttner
STATISTICAL OFFICER OF A FIGHTER GROUP

and duty assignment of each man. The efficiency of a squadron, or of an Air Forces unit, depends immeasurably on getting the right man in the right place.

Malassignment and maldistribution are haunting problems. But accurate records and prompt recognition of the personality and training necessary for each squadron specialty can aid inestimably in the elimination of these two bugaboos.

Take the case of Corporal Y. When our squadron was activated he became a heavy refueling unit operator, assigned to that specialty because they needed one. By virtue of his training and interests, Corporal Y was obviously equipped to fulfill a specialty much higher than the one he occupied. Yet the necessity of the moment ordained otherwise. It came to the attention of the personnel officer that this soldier was using his spare time to observe the mechanics at work. On one or two occasions he even diagnosed the trouble to the amazement of those present. An alert crew chief perceived Corporal Y's interest and ability and advised him to see the personnel officer at once. A brief interview resulted in the reclassification and reassignment of Corporal Y. Today he is one of our most industrious and capable crew chiefs.

Then there was Sergeant J, an excellent sheet metal worker, but also a crack mechanic. Although he was classified as the former, the engineering officer wisely realized that it takes much longer to train a highly skilled AM than a sheet metal worker. Today Sergeant J is a flight chief, an asset to his outfit.

The record is replete with such instances of malassignment and reclassification. Because the Army Air Force has grown by leaps and bounds, its rapid expansion has created problems in personnel which are now apparent.

Prompt action at the squadron level can correct waste. How? Well, let's try to visualize what happens to a soldier from the time he reports for squadron duty until he is efficiently located in his proper capacity.

Upon reporting, each man presents his service record, AGO Form 20, and allied papers (compliance with AR 345-125, Change 9, dated November 28, 1942, is important). These records are carefully studied by the personnel officer and the man is interviewed.

The importance of this first interview cannot be overstressed. What is the man's personal appearance? Is the salute military? How does he answer questions? Do his personality and overt intelligence compare favorably with his AGCT scores? Did he choose this specialty or was it imposed upon him? A chance question may unfold an experience which will change the soldier's Army career. Is he interested in OCS? What is his "overseas" attitude?

THIS interview may reveal, and frequently does, that War Department objectives and aims as outlined in AR 615-25, 615-26, 615-28 and 605-90 have been thwarted. It may show that some of these men are unfit for training in a unit preparing for overseas combat, because the personality, the psychological and physiological format of certain of these individuals render it unwise to waste time and money on their training.

Assuming that the interview results in a proper classification and duty assignment for the soldier, and that his records are in order, he will begin his training. Very few of the enlisted men reporting are at once equipped to function in a "trained" capacity. Most are graduates of some Air Force technical school, some are christened in their specialties, others inherit them like the meek. They must undergo a lengthy period of departmental training, gradually accomplishing the transition from "in training" to "trained" over a period of months. (Note: In our squadron the number of men equipped to function at once in a trained capacity was only four per cent, discounting the original cadre.)

Some men need additional technical training. Suppose, for example, orders should be issued to change from a liquid-cooled aircraft engine to the radial engine. This involves additional schooling for nearly all the engineering specialties and added education for numerous specialists from supporting departments such as armament, ordnance, communications and supply.

Once safely launched on their departmental careers, the men must be trained rapidly but efficiently in the art of their specialty. A man is not "trained" in our squadron until he can perform his operational duties without supervision. But he may never be trained, even after the achievement of technical perfection, unless he knows how to work with his fellow soldiers. The person-

ality element is vital in overseas combat. "Keeping 'em flying" is not accomplished by mere technical skill alone. The will to win and the ability to withstand pressure under fire are equally important.

One of our squadron department heads outlined what he thought were the foremost criteria in judging a man's fitness for the position he holds:

I. *Proficiency* of man in his particular craft, skill or endeavor (including manifested interest therein).

II. *Military aptitude, demeanor* and *bearing.*

III. *Reliability, integrity* and *fidelity.*

IV. *Resourcefulness* and *perseverance.*

V. *Personality* (i.e. the degree of success in relationships with superiors, subordinates and other associates).

Compare these with the principles laid down in a training directive of our parent group:

A. *Discipline* that permits unquestioned obedience under battle conditions.

B. *Health, strength* and *endurance* to withstand the rigors of global warfare.

C. *Technical proficiency* to the extent of not only knowing your equipment but to improvise ingenious substitutes when normal sources of supply fail.

D. *Initiative* enough under abnormal conditions and emergencies to start proper action in the absence of orders.

E. *Leadership* to control subordinates.

F. *Teamwork* to work harmoniously in achieving tactical proficiency and the ultimate success of the unit in combat.

G. *Responsibility* for assigned materiel and personal acts.

H. *Tactical proficiency* in ground and air combat.

The progress of the specialist is charted in many ways. The Army Air Forces recognizes the importance of combat training and wisely provides for its recording by a number of personnel techniques, including:

A. AAF Forms 127 and 128.
B. AAF Forms 125 and 126.
C. The service record and AGO Form 20.

To these, the squadron has added:

D. The weekly department roster.
E. A squadron board.
F. Squadron Form 20a (used when AGO Form 20 is not at hand).

Such mimeographed devices as departmental assignment and transfer slips, work orders, training charts, ground and air echelon rosters based on the T/O are also employed whenever necessary.

To BEGIN a discussion of all these techniques is in itself material for a lengthy article. However, a number of interesting facts present themselves in connection with the use of the various forms:

I) *AAF Forms 127 and 128*—present an excellent and accurate bi-weekly birdseye view of squadron personnel, revealing the percentage of trained and untrained men and the shortages and overages as well as promotion potentialities. Form 127 is the most important personnel report in the Army Air Forces because it is useful in all echelons. It should be prepared with painstaking accuracy and should reflect authoritatively the training progress of every unit. Guessing destroys its aims and purposes.

To make it more scientific, a weekly departmental roster such as used by our squadron is suggested for adoption. Prior to every Tuesday at 1200 each department is required to submit a personnel roster by name, rank, serial number, "trained" or "in training", duty rating, and section assignment (Flight A, B, C or Headquarters). This simple device enables the 127 to reflect a true picture of squadron personnel achievement. Up to the minute cooperation from group and wing results in prompt transfer of overages and equally prompt fulfillment of shortages.

II) *AAF Forms 125 and 126*—In an effort to improve its personnel setup the Army Air Forces initiated the Macbee keysort system consisting of Forms 125 (Officer) and 126 (EM) accompanied by a pick and punch and metal container, a strange but effective assortment. Like many novel devices, its debut was greeted with some skepticism and there had been little training in its use. But properly employed, it has advantages for Army Air Force use over the AGO Form 20. Since the Macbee system contains all the necessary information in a simple form, it is practical to use and easy to teach. And, its simpler operation makes it easier to keep up-to-date. Furthermore, the fact that the forms coincide in format with the arrangement of Form 127 makes their use doubly valuable. Statistical control units and statistical officers rely on the Macbee system to streamline the personnel setup of the Army Air Forces. And in big business it has already proved itself an adequate proving ground for the Army Air Forces.

III) *Squadron Board*—Using a "visual morning report" or squadron board enables you to determine the immediate classification, duty assignment, and present status of every individual in the unit 24 hours a day. Inspector Generals have been cautioned to quiz soldiers and to examine carefully unit personnel records to detect disparateness in classification and duty assignments. When you have the whole picture before you at all times such differences are easily detected and may be promptly remedied. You can also determine at a glance what personnel are assigned to each flight and headquarters, who is on furlough, who is sick, who is attached, AWOL, and what have you. Particularly is this helpful for flying commanding officers who must devote smaller periods to the study of administrative and personnel problems.

Construction of a squadron board is not difficult. One such as that used by our squadron and pictured on the preceding page can be built by the unit carpenter in no time. It pays dividends. And keeping it up-to-date is easy. Just have the clerk face the board with the report of change cards in one hand and with his other hand free to switch the cards accordingly. And there you have the morning report etched before your eyes.

IV) *Higher Echelon Devices*—Group and wing have created helpful personnel devices which are refinements of the basic forms. All of these aid in streamlining the personnel setup and help to project the intricate organizational process in camera form for higher echelon purposes. Where this is overdone there results needless duplication and overburdening in lower echelons.

In the last analysis, regardless of the various techniques available, the secret of personnel success rests in the efficiency of the basic unit, the squadron. And in that connection a number of "don'ts" and "do's" are in order:

1) *Don't* treat human material lightly just because there seems to be plenty of it around.

2) *Don't* misuse the power of transfer and separation because a soldier lacks the expected qualities necessary to perform his immediate duty. There is great salvage value in human material.

3) *Don't,* on the other hand, retain highly undesirable individuals where they reveal gross limitations in the performance of any duty. Loyalty is no substitute for competence.

4) *Don't* label a man as incompetent because of a low AGCT score. He might have been full of typhoid and tetanus vaccine and have lacked sleep when he acquired that brand.

5) *Don't* withhold opportunity from a man when he can better himself. No one is irreplacable — and the Army Air Forces nearly always benefits.

6) *Do* put the power of classification and reclassification in the hands of an officer trained for that purpose. Haphazard use of these techniques results in waste and inefficiency.

7) *Do* strive to upgrade personnel. Retention of capable men in "lower" skills is detrimental.

8) *Do* take full advantage of the Army Air Forces technical training program. Education brings out the best in your men. But avoid careless selection of students. Some men are simply not cut out for school.

9) *Do* promote men as rapidly as they deserve. There is no formula for promotion; it varies with the individual. However, it is a good rule to provide some measure of promotion incentive at all times.

10) *Do* maintain the reporting system up-to-date. The Army Air Forces is such a vast organization and is growing so rapidly that inefficient reporting causes "bugs" in the personnel setup.

Far be it from these to serve as the Army Air Forces' personnel "Ten Commandments". The number of "don'ts" and "do's" is endless, proving that personnel is as complex a problem as the human being. (And the ability to understand the human being is basic for the comprehension of the vast problems of personnel.) But the problems of personnel are of prime importance, for in manpower, properly equipped, lies the key to an efficient combat force and to ultimate victory. ☆

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20	6.50	31	7.20	42	8.90
21	6.50	32	7.30	43	9.20
22	6.60	33	7.40	44	9.50
23	6.60	34	7.50	45	9.90
24	6.70	35	7.60	46	10.30
25	6.70	36	7.70	47	10.80
26	6.80	37	7.90	48	11.40
27	6.90	38	8.10	49	12.00
28	6.90	39	8.30	50	12.70

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In order to furnish maximum protection for members of the Army and their dependents, the Congress provided National Service Life Insurance. It is to the personal advantage of every officer and man to have this protection. The cost is small, and with present pay rates every soldier should be able to carry the maximum amount authorized.

—Henry L. Stimson, Secretary of War.

OUR COMBAT SPIRIT

The outstanding impression gained during my visit to the African, Middle East, and Far Eastern Theatres was that every young officer and enlisted combat crew member had the utmost confidence in himself, in his fellows, and in the equipment he was using so effectively.

Every Army Air Forces man preparing for combat should gain increased inspiration from the supreme confidence and fighting spirit of our comrades overseas.

Those who have fought the enemy have no doubt as to the outcome of this war. Combat crew members know they can meet any enemy on equal terms. They praise their equipment and would not exchange types of airplanes. Their intense loyalty and mutual confidence is everywhere apparent.

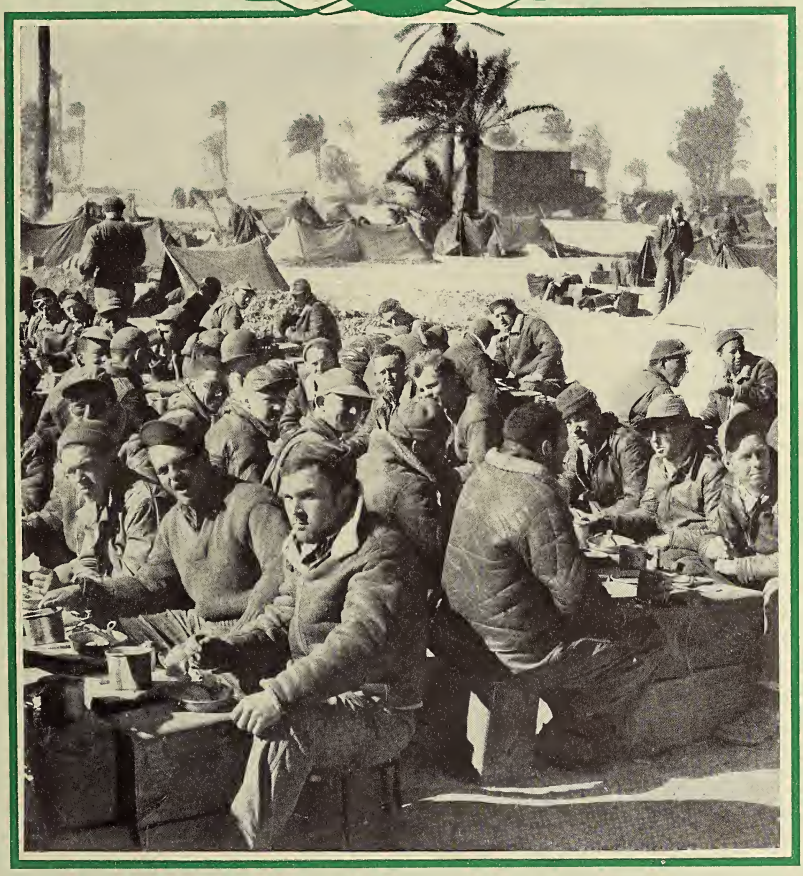
I proudly commend the glorious combat spirit of Air Forces fighting men overseas. Their admirable example should inspire every officer and enlisted man to new zeal and greater enthusiasm for the challenging task ahead.

H. H. Arnold

GENERAL, U. S. ARMY
COMMANDING GENERAL, ARMY AIR FORCES

AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES



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AIR FORCE

OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

July Brief

As this issue of Air Force goes to press, the British Air Ministry announces formation of a tactical air force for all home-based aircraft of the RAF. The new command, which has absorbed the RAF Army Cooperation Command, is a direct outgrowth of the highly successful role played by the Northwest African Tactical Air Force in driving the Axis forces out of Africa. This role is described fully by Brigadier General Laurence S. Kuter, who served as American Deputy Commander of the Northwest African Tactical Air Force, in the article, "Air-Ground Cooperation in North Africa," appearing on Page 4. General Kuter formerly was Deputy Chief of the Air Staff. He prepared this article while in Washington on temporary duty following the surrender of the last remnants of the Axis forces in Tunisia.

Three other features in this issue of the service journal reflect additional phases of AAF participation in the North African campaign. The co-pilot of a heavy bomber describes his thoughts and experiences during the first AAF raid on Naples in an article on Page 7. The story of how ground crewmen of a B-26 Group had to use every stunt in the book and then some to keep their planes in the air during the early days in Tunisia is told on Page 12 in an article by Lieutenant Gordon H. Coe. This month's cover, showing men at chow in North Africa, is augmented by two pages of pictures (19 and 20) depicting the life of AAF personnel at our airdromes and bases in that theatre.

While the clean-up of the Axis forces in North Africa has permitted a decided increase in Allied air attacks on southern Europe, there has been an even greater acceleration of American and British raids on the continent from bases in the British Isles. Aircrew members who may be picked for the assignment to Britain will be particularly interested in "Have the Best Crew of Them All," on Page 14. In this article five members of a B-17 crew—pilot, navigator, bombardier, radio operator and top turret gunner discuss their specialties based on experience gained in bombing raids over Europe. The co-authors, members of the first bomber crew returned as a unit from the European theatre, completed OTU at Walla Walla, Washington, last summer.

The globe-circling civilian pilots of the Air Transport Command are described on Page 9 in an article by Colonel Harold R. Harris, Commanding Officer of ATC's Domestic Transportation Division. The author reports that their uniforms aren't well enough known by AAF personnel and suggests that these carrier contract airmen be recognized as veterans who probably have "forgotten more about flying than you'll ever know." Colonel Harris, a pilot officer in the first World War and former test pilot, tells of sample experiences ATC pilots have had in the months they have been operating the round-the-world service. When Colonel Harris was recalled to active duty with the ATC he had been associated with long-range commercial air transport since 1928. Several years earlier, he had been chief of the flight test section of the Air Corps Experimental Field at Dayton, Ohio. In 1926 he held thirteen world aircraft records at one time.

But, of course, civilian ATC pilots aren't the only airmen flying the oceans these days. AAF officers and men are ferrying planes daily to the combat theatres all over the world. One of the most vital of these ferry routes is that across the South Atlantic, and one of the most important phases of the trip is the briefing pilots and their crews get at Morrison Field, the "Grand Central" of this southern run. A description of briefing at Morrison has been written for Air Force by Captain T. W. Finnie, Group S-2 officer at the field. His article appears on Page 28.

Wild and woolly tales of terror in the jungle with its ferocious beasts, deadly snakes and man-eating plant life are considerably debunked by the Arctic, Desert and Tropic Information Center this month in the article, "Exploding the Jungle Myth," on Page 22. The ADTIC experts advise men who are headed for the jungle country to visit their local zoo before departing and take a good look at what probably will be the only animals and other jungle critters they will see before they return home.

Further standardization of the AAF flying training program and greater uniformity in cadet instruction is anticipated in the establishment of the Central Instructors' School at Randolph Field. The work of this new school is described in the article, "Taking the Kinks Out of Training," appearing on Page 34. The author is Colonel Edward H. Underhill, director of training at the school.

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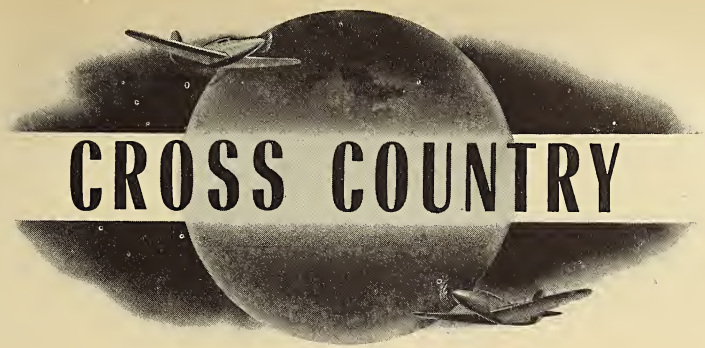


CROSS COUNTRY

Changes in the gunnery program, and other developments of the month within the Army Air Forces.

AERIAL gunnery occupies a top spot on the Air Forces "check list." Combat experience has definitely linked shooting ability to the success of missions, and has resulted in some significant changes in our gunnery program.

One interesting change eliminates the "career gunner"—the man who knows only gunnery and goes straight to combat without first acquiring a technical skill.

This doesn't affect the status of the "career boys" who have already learned their gunnery, many of whom are now shooting it out with the enemy, but hereafter gunnery training will always follow technical training. Until recently you could take gunnery training before or after the technical.

It has been found that a gunner, like a ball player, must have continual practice to maintain his shooting eye. This shift in the training schedule will enable trainees to start gunnery after other training has been completed and then continue to practice through OTU and on into the combat area.

Back in December gunnery was made mandatory for radio-operator mechanics, airplane mechanics and airplane armorers. Other changes now taking place are designed to increase the practicability of training. Instead of the five or six weeks' course, for instance, a seven weeks' course is being instituted. It will include four solid weeks of firing from ground and air at all conceivable types of targets.

In addition, schools are practically abandoning written examinations in favor of actual demonstrations of ability, the reason being that men with academic proficiency were not always found to have an equivalent manual dexterity. Increasing stress is being placed on manual ability, although thorough knowledge of an academic type is still necessary. The manner in which you flip your hands around is rather important when you're being tested on your ability to correct malfunctions at 25,000 feet with mittens on.

Here are a few of the more important accomplishments demanded of students of the Flying Training Command's flexible gunnery schools before graduation and assignment to OTU and RTU:

Detail strip the gun, blindfolded, without special tools, and, after the instructor has mixed up the parts, accomplish the following while reassembling the gun: pick out the part, name it and describe what is broken on two or three broken parts, intentionally placed with other parts by the instructor.

While blindfolded: enter and leave the turret correctly, quickly and with minimum physical exertion; locate all switches, turn them on in proper sequence and start the turret without delay.

Show ability to estimate range at 300, 600 and 1,000 yards for all enemy aircraft taught in Aircraft Recognition.

WASHOUT

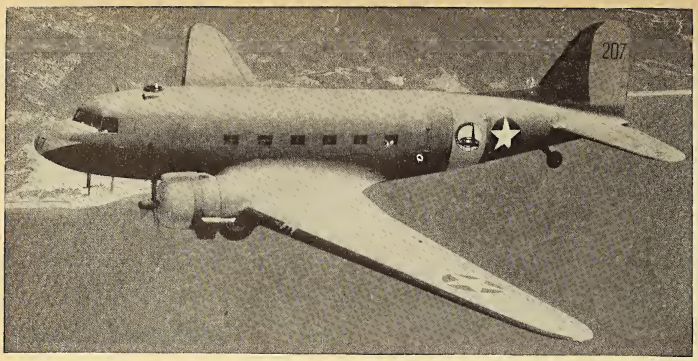
One of our favorite little stories concerns a lieutenant in a heavy bombardment group in North Africa who took a truckload of enlisted men into town for a dip in the public bath. Being a bit vague about its location, the lieutenant stopped a native and asked for directions. But the Frenchman knew no English and the American knew no French. So the lieutenant did a pantomime, going through all the motions of removing his clothes and taking a bath. The Frenchman watched the act closely, glanced at the eager faces of the men, then smiled broadly in perfect understanding. The address he gave was near by. Upon arrival the lieutenant lined up his men outside, each with towel in hand, and went in to make the necessary arrangements. It didn't take him long to discover that the establishment was a *maison de joie*. We understand an orderly retreat was accomplished, and the original objective attained. (For this one we are indebted to Lieut. D. R. McGoldrick, APO 520, New York City.)

THE ENEMY WILL REGRET

We have just received a report on Staff Sergeant Shorty Gordon, hero of the article "Angels Don't Shoot Guns" in the June issue of AIR FORCE. As you may remember, a postscript to that article stated that Shorty was missing from a raid on Germany and believed to have bailed out over enemy territory.

It has now been definitely established that Shorty is a German prisoner of war.

Peashooter



Nose, engine cowling, fuselage and rudder of planes used by Domestic Transportation Division, ATC, now have identifying bands of yellow.

New Transport Command Markings

Certain yellow plane markings have been adopted by the Domestic Transportation Division of the Air Transport Command to make their planes engaged in training and cargo operations more easily recognizable from the air and ground. (*See cut above.*)

All planes of the Command used in transition transport training, as well as those ships in the United States and on domestic routes from Brownsville to Panama engaged in cargo operations, will have their vertical tail rudder painted yellow with eighteen-inch-high black figures giving the ship number. Girdling the fuselage just behind the cargo or loading door will be a 42-inch yellow band, with the circular insignia of the Air Transport Command painted in the center of the stripe on both sides of the plane. Between this yellow stripe and the tail assembly will be the white and blue circular star insignia of the AAF.

The engine cowling on all ATC planes in this category will be painted yellow and each ship will have a yellow diamond on the nose, approximately twenty by forty inches in size with four-inch-high black figures. In the case of twin-tailed types both tail rudders will be painted yellow. For general information, the various types of training planes common to Air Transport Command operations are the C-53, C-49, C-48, B-25 and AT-17.

These markings, the Air Transport Command points out, are not to be confused with the yellow identification markers in use by the Troop Carrier Command. The outstanding differences are that on Troop Carrier Command planes the stripe girdling their planes is farther back on the fuselage and the wing tips are painted yellow.

The Winnah

The somewhat popular opinion that wartime expansion of flying had led to a relatively large number of training accidents within the Army Air Forces got a solid kick in the teeth last month when the Air Forces received the safety award of the National Safety Council.

The Safety Council, 32 years old and considered the top authority on such matters, had made eleven previous awards but this was the first time a military organization copped the honors. All the others had gone to industrial firms.

The award is based on maximum production with minimum loss of manpower. In this case, it meant the maximum production of pilots with the minimum loss of life. The clincher was the fact that 95 percent of Army Air Forces trainees complete the training phase of the program without an injury.

The Eyes of Texas

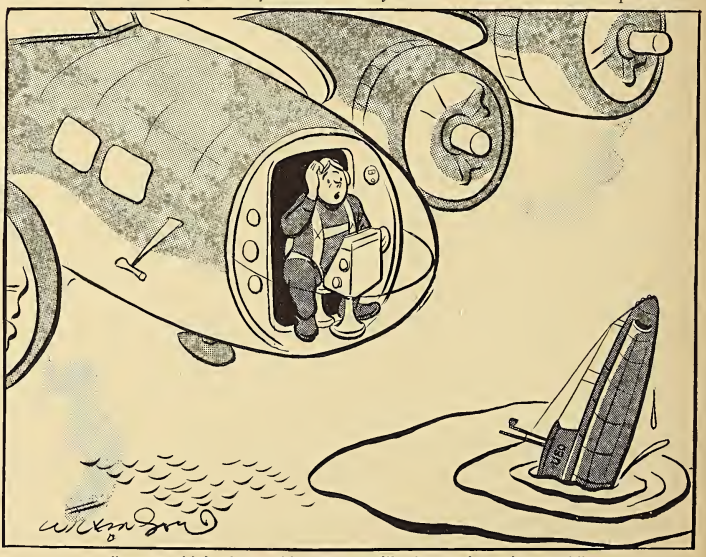
It requires no provocation at all for a Texan to leap to his feet, clear his throat, and burst forth into what he considers the national anthem, "The Eyes of Texas Are Upon You." This is a little tale about two such eyes, and rather sharp eyes at that. Our hero is Staff Sergeant Raymond C. Matthews, Jr., of the 404th Base Headquarters and Air Base Squadron, at Texas' Fort Worth Army Air Field.

The story begins with a jangling telephone in the office of Captain R. E. Dysart, former Fort Worth Chief of Police, now Civilian Chairman of the Office of Civilian Defense in that city. The caller identified himself as Sergeant Matthews, home on a three-day pass from Tarrant Field (at that time the name of the Fort Worth Army Air Field), and said he had spotted an Italian Savoia-Marchetti 81 bomber over the city at about 1,000 feet.

Dysart then checked with the post intelligence officer at Tarrant Field and Matthews was identified by that office from personnel records and reached by telephone at his home. He substantiated the report to Intelligence that he had given to Civilian Defense, describing precisely the recognition features of the plane—three engines, low wing monoplane, tapered leading and trailing edges, rounded wing tips and peculiar bracing of the tail. Matthews said he had worked in the aircraft recognition section of the ground school at the station and, despite the improbability involved, was positive of his identification of the foreign aircraft. In fact, he became downright insistent.

Well, as you might have guessed by now, Matthews really knew his stuff. It was definitely established, through higher Civilian Defense Control sources, that a Savoia-Marchetti 81 had actually been over Fort Worth. A checkup revealed that the ship had taken off from Brownsville, Texas, for Meacham Field, Fort Worth, developed landing wheel trouble and could not land at Fort Worth but later made a successful landing at Dallas.

Just what mission the Italian plane was



"Now to think of something clever — like 'Saw sub, sank same!' "
—FRITZ WILKINSON

performing was not announced, but it's no secret that captured enemy aircraft are being brought in from the combat areas for purposes of study.

Anyway, we have added Sergeant Matthews to our personal heroes file and hope there are more like him.

Skirts

We're not so sure about this one, but anyway it's Technical Sergeant Joseph F. Marling's story, not ours. By way of introduction, he served as engineer on the B-17 "Yankee Doodle" and has more than fifty combat missions to his credit in the Asiatic Theatre. On a certain overwater mission, reports Sergeant Marling, they flew low over friendly natives in canoes. The girls in the canoes wore only grass skirts, and there was such enthusiastic handwaving both from the air and water that a return run was made. Enthusiasm mounted on all sides, but the girls stole the show by removing their skirts and waving them high in the air at the boys. How low can you fly a B-17, anyway?

"How Our Army Grew Wings"

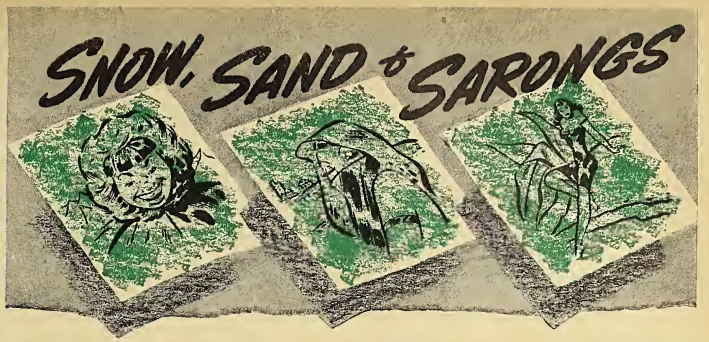
Our Army grew its wings the hard way. A detailed account of the struggles, disappointments, tragedies and triumphs of that small band of enthusiasts who were willing to risk their necks for the future of military air power is contained in a new book, "How Our Army Grew Wings." The authors are Charles de Forest Chandler, late Colonel, U. S. A., and Frank Purdy Lahm, Brigadier General, U. S. A., retired.

The authors are well qualified to write of airmen and aircraft before 1914, which is the period of military aviation covered in the book. Colonel Chandler was the first Chief of the Aeronautics Division of the Signal Corps. General Lahm was the Army's first airship pilot, and Major General in command of the Gulf Coast Training Center at the time of his retirement in 1941. Both were members of the board which tested and accepted the Army's first airplane.

The book ($3.75) is published by the Ronald Press Company, New York City.

For Pilots of World War I

We've been asked to tell old-timers that membership rolls are now open in the Order of Daedalians, an organization composed exclusively of commissioned World War I Army heavier-than-air pilots. Anyone who held the "R.M.A." or "J.M.A." rating with its silver wings prior to the armistice on November 11, 1918, is eligible for membership. Pilots who remained on active duty pioneered the fraternity under the leadership of the late Brigadier General Harold L. George, who assembled the original charter members constituting Flight No. 1 at Maxwell Field in March of 1934. However, the movement is now open to all who have the above qualifications. Anyone interested can obtain additional information by writing its Wing Headquarters, Room 4C 870, Pentagon Building, Washington, D. C. — The Editor.



TIPS FROM THE ARCTIC, DESERT AND TROPIC INFORMATION CENTER

Desert Note. It happened on a sand-waste of Cyrenaica. Under a rare, cloudy sky, a Tommy struck up a conversation with an old Bedouin and his middle-aged son. "Looks like rain," he observed. The old man smiled skeptically: "I think not, but I hope so, *for my son's sake.* I have seen it rain . . ."

Pacific 'Chaser.' ***Some of our fighting men in New Guinea have discovered that a certain species of crab carries under his shell a small pouch filled with pure, distilled water. The exact species of the crab isn't known to us at the present time, but an appropriate name might be the "Oasis Crab."***

Hot Strategy. Americans stationed in Iraq, the great "land bridge" between Europe and India, have discovered that strategy applies to more than warfare in Moslem countries. For example, they've found out that when they are offered a third cup of coffee by their host, it's not a gross display of wealth or sheer disregard of the rationing system, but a polite Moslem way of pointing out that the visit has definitely come to an end.

Arctic Bombers. ***In the summer, mosquitoes are thicker above the Arctic circle than anywhere south of it, the tropics included—thicker and hungrier. Even in warm weather fighting men have to dress completely for protection against the assault of this impressive and harrassing air force. Men go about completely clothed, down to gloves and headnets, and that means sweating under the 24-hour summer sun. But it's either sweat or be 'et!***

Jungle Jitters. Landing in jungle rivers has given many a pilot a pain in the neck. When looking from one bank of a river to the other, a mirror-image of the foliage and sky may be so perfect that the waterline can't be discovered. This phenomenon of dead calm is common. It's tough to judge your altitude when landing; you don't know whether you're fifty feet or fifty inches above the water surface. Ripples caused by boats break the mirror-like image and may help the pilot gauge the surface. Pilots can also buzz down and let the prop-wash create a ripple.

Color Scheme. In many parts of the Arctic—such as treeless regions, sea areas or inland ice—distinctive landmarks are few. Man-made landmarks are therefore often of special importance; one color in particular has been selected as the most effective for recognition purposes. It is called "Flame Scarlet" and it was developed by the Bureau of Standards for the first Byrd Antarctic expedition. To the average eye, it looks like a bright orange color. It shows up better on snow and green surfaces than any other shade. Signalling devices, markers, etc., used in Arctic regions should be "flame scarlet" in color. Bright orange crepe paper, the kind you can get at any five-and-dime store, makes a good temporary signal when stretched out; it packs away tightly, is light and easy to tote along.

Drinking Habit. ***Coral absorbs water like a sponge. The deeper layers are saturated with salt sea-water, but the upper surfaces are fresh with absorbed rainwater. Sip from the surface, say South Seas natives.***

Star Gazing. Here's the ABC of desert navigation as practiced by the Arabs: When travelling at night, they take their directions from the pole star, selecting another star in the direction in which they desire to travel. At intervals, they pick another star in the same general direction, since all stars move westward. Sometimes a guide will doze while walking and follow one star too long. It's a sure way of getting lost.

Snake-Lore. ***The movements of "trained" cobras, supposedly in response to the strains of seductive music, are not the result of the music at all, but of the Li'l Egypt movements of the snake-charmer. The cobra can't hear airborne sounds, but it watches and moves with the motions of the charmer.***

Sky Maps. ***With experience, a pilot can tell from the color reflection on an overcast Arctic sky the general type of country lying ahead and beneath him. Dark patches on the overcast indicate open water, bare or snow-free ground. Often, on ocean flights, islands will reveal themselves in reflections on the overcast.***

Gas Dope. In desert operations, extreme care is taken with high octane fuel at temperatures of 110 degrees or more in the shade. To avoid sparks, gas drums often are opened with bronze or other non-sparking tools. Also, the plane is grounded, as are the refueling funnel and nozzle.

The Arctic, Desert and Tropic Information Center welcomes contributions from all Army personnel with knowledge of the non-temperate theatres of operation. Submit to: Arctic, Desert and Tropic Information Center, Eglin Field, Fla.

AIR-GROUND COOPERATION IN NORTH AFRICA

By Brig. General Laurence S. Kuter

American Deputy Commander, Northwest African Tactical Air Force
North African Campaign

When the campaign in North Africa came to a close, with thousands of Germans and Italians voluntarily streaming through the dust toward our prisoner cages, the Allies had won a victory marked by the highest type of coordination in manpower and weapons.

There had been complete unison among British, American and French fighting elements.

There had been concerted action by all air, ground and sea forces.

There had been, particularly, an effective teaming of air and ground strength right in the battle area—with air power providing infantry and armored divisions with a measure of aid and support probably never before attained.

To officers and men of the Army Air Forces, this air-ground cooperation was among the most significant developments of the war to date. It was achieved by the introduction of a new type of air combat unit —the tactical air force.

Established during the campaign itself, this organization allowed for the employment of air power in a concentrated mass, striking at such time and at such points and with such speed as to be most valuable in the over-all operation. It prevented the misuse of air power, the scattered, inefficient employment of planes and personnel so likely to occur under old conceptions of air support.

It is intended that the lessons learned and the successful methods developed in air-ground cooperation shall be translated into the broad American air effort as quickly as possible.

During the Tunisian Campaign, Air Marshal Tedder, under General Eisenhower, commanded the Air Forces in the Middle East, in Malta and in Northwest Africa.

Lieutenant General Spaatz commanded all of the Northwest African Air Forces, the fighting elements of which were the Strategical Air Force under Major General Doolittle, the Coastal Air Force under Air Vice Marshal Lloyd, a Photographic Wing under Colonel Roosevelt and the Northwest African Tactical Air Force under Air Marshal Coningham.

This discussion concerns the *air-ground cooperation* between the top air unit in the battle area, the Tactical Air Force, and the top ground unit in the battle area, the 18th Army Group. Because this discussion concerns *only* the Northwest African Tactical Air Force in the battle area, it should not be inferred that the magnificent work of the Northwest African Strategical Air Force on the ships, ports, docks and distant air bases on which the Axis forces in Tunisia depended was not appreciated by our battle area air and ground forces.

Most certainly, our victory was directly influenced by the Strategical Air Forces' shattering blows on more distant links in the Axis armor and on the Northwest African Coastal Air Forces' effective protection of our ports and coasts and, naturally, on extraordinary efforts by Major General Dunton's Air Service Command and Colonel Ray Dunn's Troop Carriers. Our battle area air force is only one of several air forces which can claim a portion of General Eisenhower's Allied Force victory.

The Tactical Air Force is a completely new idea in the organization of an air force fighting in the field alongside of an army. The idea was not evolved from book study or by theorists. Its conception, together with the details of its organization, grew gradually and as a direct result of long and bitter battles stemming back to the air-ground efforts of the British crossing the Western Desert. During the years of that fighting, a series of failures illustrated errors in air-ground cooperation and a series of successes indicated effective methods. In the Tactical Air Force we combined the desirable features learned in the Western Desert, and we believe we have eliminated the errors that had previously been made.

The concept of air-ground organization in the Tactical Air Force and in the 18th Army Group can be traced back to June, 1940, when the RAF could oppose a large, powerful and more modern Italian Air Force in Libya with only a handful of obsolete aircraft. This tiny RAF force not only held its own but eventually swept to complete victory when General Wavell, now a Field Marshal, advanced for the first time across Cyrenaica.

In that operation the Italian Air Force in Libya operated under the direct command of the Italian Ground Forces. The Italian Air Force consequently was used in penny packets at the order of local army commanders to give protection to their own local sectors. In contrast, the RAF, employed as a true air force and in concentrated mass, completely destroyed some 1100 Italian aircraft.

By the campaign of 1941-1942, the British had a large and efficient air force in the desert, this time opposed by the Luftwaffe. Several factors, principally the drain on

How the Tactical Air Force functioned in the North African campaign, and its potential influence on future operations

the British ground forces resulting from their requirements to move large units to the Far East, resulted in the long and now famous retreat to Alamein. Even though Rommel was continually pressing the ground forces back at this time, the air was largely controlled by the RAF in the Western Desert. The RAF was responsible to a great degree for the fact that Rommel did not annihilate the British Army at this time and was finally halted at Alamein.

During the lull that followed at Alamein, Air Vice Marshal Coningham, then commanding the RAF units in the Western Desert, put the final touch to his training and tactics and rebuilt his numerical and qualitative strength. The air force which was launched against Rommel in connection with the success of the 8th Army at Alamein and which pursued the defeated enemies across the desert to Tunis was in effect the first full flowering of a tactical air force, although at that time it didn't hold that name.

On February 18, when the Northwest African Air Force was formed, Air Marshal Coningham, promoted and knighted after Alamein, was placed in command of all air forces fighting in the battle area alongside the armies. Our Tactical Air Force, therefore, composed of both British and American units of fighters and bombers, was the first expression in actual practice of the years of experience gained by the RAF in the only theatre in which allied air units have fought the enemy alongside the ground units in the field. It was the quintessence of battle experience, the result of many mistakes, many trials and at last resounding success.

It was something far superior, as proved by results, in organization to anything which the Germans had ever evolved. It is an example on a big scale of the encouraging fact that the Allied commanders are clearly able to utilize the experience gained by hard fighting in this way. It is the pattern of the future, the way in which air power in collaboration with armies in the field will beat the enemy and win the war.

Doubtless, in the course of time and future experience, changes will be made, but the basic conception of a Tactical Air Force as the air power in the actual battle area will probably remain until the end of the war as tried and proved.

The function of the tactical air force is one of working in partnership with other components of air power, with the strategical bombing force which uses the longest range bombers on relatively long-term targets, such as munitions establishments, supply ports, and the like. The tactical air force works with the coastal air force which is intent on cutting the enemy's supply route by sea and in protecting our own. The tactical air force is concerned with the battle itself immediately in the battlefield.

It is easy to say that such an air force gives air support to the army, but the word "support" has now so many old-fashioned and wrong implications in the public mind that it is much better not to use it. The word "support" always makes people think of air power used as an ancillary weapon of the army or navy; in operations which are primarily land or sea. It brings to mind a picture of bombing to extend the range of artillery, and particularly of squadrons of fighters at the immediate imperative call from ground commanders of relatively small sectors to attack enemy troops immediately in front of them or to defend their own troops from enemy bombers.

The local ground commanders obviously cannot have any knowledge of what is happening over the wide area of the land battle and of the air battle. So this conception obscures the inevitable two phases of the modern battle—the air phase and the combined air-ground phase. The narrow conception of air support is firmly imbedded in the public mind and particularly in the mind of the inexperienced soldier who is having his first taste of enemy bombing or strafing. That method is precisely the method by which the Italians threw away their air force with no gain in Libya. Although it is the method by which the Germans advanced through France, when air opposition was very scant, it is surely the method which was found to be totally obsolete and leading more toward defeat than victory in operations against a well-trained army and a well-trained air force in Africa.

It is much better to speak of *collaboration* between the army and the tactical air force. The army strikes from the ground, the tactical air force strikes from the air. The method by which this coordinated air-ground effort is applied is best illustrated by the workings in the combined air-ground headquarters in the battle area in Tunisia.

In a tent camp in the Tunisian mountains, the air and ground commanders lived and worked side by side. One was General Alexander, controlling and coordinating the 18th Army Group which consisted of the 8th Army, the 1st Army, 2nd U. S. Corps and the 19th French Corps. The other commander was Air Marshal Coningham, controlling and coordinating the Tactical Air Force which consisted of the Western Desert Air Force in the South and two fighter forces in the West which were backed up by a tactical bomber force. General Alexander controlled the land forces in the battle area. Air Marshal Coningham controlled the air forces in the battle area.

THE two commanders lived together in intimate daily consultation. They made their plans together, each stating what his force could contribute toward the general victory. They worked in complete harmony. They both knew that only the long reach of air power could achieve the quickest triumph in Tunisia, which was a destruction of the enemy rather than pushing him out of Africa. So General Alexander on his part moved his ground units steadily forward to capture and protect the air fields needed to tie down and then drive forward to capture the enemy.

Air Marshal Coningham's effort was in two distinct phases. First, the requirement that he reduce the enemy air to practical impotence, and after that to throw the full weight of his air force against the enemy army. The importance of those two commanders of land and air forces living side by side in the same camp, eating in the same mess and planning and operating daily on equal terms in close collaboration, cannot be overstressed.

The successful stages of the Tunisian battles follow much the same pattern. First came the 8th Army push through the Mareth positions. The Mareth battle actu-

Stuck in the mud! This is a problem whose solution requires plenty of elbow grease.

Loading bombs on a P-40 of a Fighter Group in North Africa. Note daisies in the field.

ally began with an air blitz on enemy airdromes. Prior to the attack of the 8th Army, Air Marshal Coningham concentrated his entire air force on the enemy airdromes. After the strength of the German air force had been materially reduced by this blitz, he kept the northern and central air units operating exclusively against the German Air Force which relieved the Western Desert Air Force and the 8th Army of any concern over German opposition in the air. This left the Western Desert Air Force free by day and by night to employ hundreds of bombers and many squadrons of fighter bombers to search out individual enemy concentrations and divisions and operate with great effectiveness in the immediate front of the ground units of the 8th Army.

At the crisis of the battle in front of El Hamma, the Hurricane tank-busters were thrown in. The enemy broke and retreated. In this particular operation, the 146th Panzer Grenadiers Division was caught moving on a road and rendered completely ineffective by air attack alone.

After a short pause the 8th Army attacked at Wadi Akarit. Again the air units in the north and center were concentrated on the German air establishment. Once more the Western Desert Air Force was free to work at a maximum intensity on the German forces in the Wadi Akarit position. Again the enemy retreated, this time more quickly than was expected, to a semi-circle position from Bizerte to Enfidaville.

At this point it was the turn of the Western Desert Air Force to draw away what was left of enemy air power while the Tactical Bomber Force lent their strength to the attack by the First Army and the Second U. S. Corps.

The battle for the capture of German forces in Tunisia began, not on April 22, on which date the ground forces pushed off, but on the night of April 18-19 when we employed ninety night bombers against German airdromes. We had guaranteed to reduce the German air force to relative impotency by dawn of the 22nd. Our operations for the next three days are already well-known in the American press. It was during these days, of course, that the JU-52s and many of the escorts were destroyed. Our total efforts destroyed 112 German airplanes those two days.

The spectacular destruction of the 20 ME-323 6-engine transports on April 22, which incidentally were carrying the equivalent of a German regiment into Tunisia, was the continuation of our plan to knock the Luftwaffe down and keep it down during the period of the ground movement forward. During this period there were terrific, spectacular and important air victories which, however, in the long run, were not so important as the steady weight of air attack that the Tactical Air Force was turning on the enemy troops in front of the 1st Army. On the 22nd and from then on we had free fighter squadrons sitting over the German airdromes daring the German to get up. On the 22nd and 23rd he did try to get up and was knocked back down. During this period, he was kept down by a small proportion of our fighters. The great balance of our force at this time was steadily in front of the main effort of the 1st Army.

The weight of daily attack during this period increased each day and was heavier than any air force had ever delivered in battle in collaboration with an attacking army. Our air units were placing in front of the main effort of the 1st Army a heavier concentration than had been employed at Alamein. This air effort increased to a crescendo on May 6 on the final drive from Medjez el Bab to Tunis. On that day we delivered 2,146 individual airplane sorties, the great majority of which were bomber, fighter-bomber or strafing missions on a 6,000-yard front before the main effort of the 1st Army. This continual rain of bombs in front of the advancing divisions had the effect of blasting a channel from Medjez el Bab to Tunis. You know the result of that drive. General Alexander's view of the effectiveness of that effort is expressed in a single sentence of his on May 8 to the Tactical Air Force: "Without your support this drive would just not have been possible."

THE fact that each step in this battle was a carefully planned one and that the results of each step were exactly the results that we expected to accomplish, both in the air and on the ground, is most reassuring. There were no accidents. None of the results came from chance happenings. This battle is clearly the result of carefully detailed and coordinated air and ground planning and execution.

One result of this particular battle is believed to be of great significance for the future. That result is briefly stated in the fact that the first 25,000 German prisoners, whom we saw in our 2nd Corps Cage on May 9, consisted of selected Nazis from two S S Divisions, the Manteuffel and Hermann Goering, and German soldiers of the highest state of training from one Panzer Division. If these men were not the cream of the German armed forces they were surely well above the average Nazi. They apparently had been ordered to fight to the last man, to eat the last biscuit and fire the last round for the glory of Hitler and the Fatherland. They did fight well and bitterly. However, when it became clear to them that they would lose that battle, they immediately surrendered without further ado. They surrendered great quantities of food. They had much ammunition still remaining. Although their units had disintegrated their individual morale was high.

As prisoners arrived for admission to the 2nd Corps Cage, many of them driving up in their own motor transport or moving in enormous columns where there was no effective guard at all, they were assembled in groups of one hundred by German officers, and marched off like guardsmen, singing German marching songs, into the cage. Surely if this picked bunch of Nazis hauled down the flag and surrendered after it had become clear to them that they had lost the battle, our course toward defeat of Germany is assured.

The effectiveness of our bombing was graphically illustrated in Ferryville, in Bizerte, in Tunis and particularly on the road from Bizerte to Tunis. Bizerte was a town and port full of establishments being used effectively by the Germans. We attacked Bizerte with the intention of blotting it off the map. On May 9 when General Alexander, Air Marshal Coningham, General Bradley and I drove through Bizerte, we drove around for over an hour and found not one single inhabitant of the city. We saw no single building, however small, which was unscathed. On the other hand, the town of Ferryville was one which we knew to *(Continued on Page 33)*

A flight of bombers sets up a flurry of sand during take-off.

FLIGHT TO NAPLES

By Lt. John H. Namle
U. S. Army Air Forces

A flight of B-17s (above) returns after inflicting this damage on the Naples harbor.

FOR a long time we had been anxious to get a kick at the shin of the Italian boot. From our secret airfield in French North Africa our B-17 Group had bombed targets in Tunis, Sardinia and Sicily, but we had been looking forward to our first visit to Italy as a memorable landmark in the Mediterranean campaign.

Awakened at seven o'clock on a Sunday morning, we were told to eat breakfast quickly as there was an early briefing. For breakfast we had pancakes, fresh eggs, cereal and coffee. We then piled into trucks for the ride to the old granary which had been taken over as the Group's headquarters.

We knew that the planes had been loaded with fragmentation bombs so speculation ran high as to whether the target was an airdrome or a troop concentration.

The intelligence officer in charge of the briefing stepped on the platform and picked up the pointer. Somewhere in the room a news cameraman's photo bulb flashed.

"The target for today is the Capodichino Airdrome several miles Northeast of Naples . . ."

This was it—the target we had been waiting for. The briefing officer went on:

". . . flying over Capri . . . Mount Vesuvius . . ."

THERE was little sound in the room while the target information, the amount and position of anti-aircraft batteries, and the number of enemy fighters we would probably encounter were revealed. The navigators checked on routes. The weather man gave his report on the weather out, the weather to be expected over the target and on our return trip. We synchronized our watches. The briefing was over.

After we had drawn our maps, trucks drove us out to the dispersal area where our planes were warmed up and ready to take off. Since it was to be a long mission the mess hall had sent out a box of food for each crew and a candy bar for each man.

At 8:45 we took off, circling the field several times while other groups joined us, making a total of about a hundred planes. The sky seemed full of grey B-17s. Then the swarm of planes assembled in formation and headed toward the coast.

Captain L. V. Casey was the pilot of "The Gremlin." I was co-pilot and we were to fly on the squadron commander's left wing.

The sky was clear although there was a slight ground haze. We passed over the north coast of Africa at about 4,500 feet. Directly below was a small fishing village clustered at the foot of a mountain. The Mediterranean was calm, clear, and the most remarkable blue I have ever seen. Near the coast, it was easy to distinguish the shallow water covering the reefs and bars.

Once clear of the land we tested our guns. The sharp rat-a-tat-tat of the practice shells sang out above the noise of the motors. Soon the steady drone of the engines became a part of the silence and we were unconscious of it. The bright sun was reflected on the metal of the planes.

The monotony of our crossing was broken by chatter on the interphone, Spam sandwiches, and Casey and I spelling each other at the wheel. Our course was directly between Sicily and Sardinia. Although we were flying at only 1,000 feet the haze almost hid Sardinia and we couldn't see Sicily at all. Clouds far off in the distance marked the coast of Italy. At a signal from our group leader we started to climb.

We went on oxygen at 10,000 feet. At 20,000 we were well in sight of the coast. Below us was the Isle of Capri, a barren, rocky island with several small white villages perched on the shore. A thin spiral of smoke drifted up through the clouds. This was Vesuvius.

As we passed over the coast of Italy, we were at about 25,000 feet. In clear view below were small, neat Italian farms, then the city of Naples, the airdrome, and even the insane asylum we had been warned not to hit. Approaching the target, we stayed about 25,000 feet for a minute or two and then dived down a few hundred feet, turning towards the target and opening the bomb bay doors at the same time. We were on our bombing run.

The engines were purring smoothly. Casey was flying and I had nothing to do but look around and watch the excitement. Off to the left, I could see the other groups dropping their 500-pounders on the docks and railroad yards. Clouds of smoke rose from the explosions. The other groups were attracting quite a bit of inaccurate flak, hundreds of large black bursts.

Then I could see bomb clusters from the other two planes of our element start to drop. That meant that our bombs would be dropping too.

(Continued on Page 32)

What's your AIR FORCE I.Q.?

Here's a hot weather teaser to test your knowledge of a variety of Air Forces questions. Credit five points for each correctly answered, and if you score 100, yell for promotion. Ninety is excellent; 80 good; 70, fair, and 60 is below par. Answers are on Page 32.

1. *The Army Air Forces' new A-36 is the dive bomber version of the*

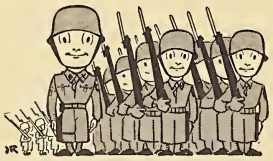
a. P-51 c. P-47
b. P-40 d. P-38

2. *Beds in barracks are staggered head to foot in order to*

a. Keep snorers from annoying others
b. Prevent the spread of respiratory diseases
c. Keep the barracks neat and orderly
d. Uphold an old military custom

3. *The expression "Full Rich" is associated with*

a. Payday c. Bombs
b. Gasoline d. An inebriated heiress



4. *All steps in marching executed from the halt begin with the left foot.*

a. True b. False

5. *Which word is inappropriate in this grouping?*

a. Benzene c. Calcium hypochlorite
b. Carbon tetrachloride

6. *When spoken to a warrant officer named Jones should be addressed as*

a. Jones c. Mister Jones
b. Officer Jones d. Warrant Officer Jones

7. *The total weight of an airplane is divided by its wing area to calculate*

a. The cargo loading c. The bomb load
b. The wing loading d. The gas load

8. *At which of the following commands are both silence and immobility required?*

a. Fall out c. At ease
b. Rest d. Parade rest

9. *It is wise to drink carbonated beverages prior to high altitude flights.*

a. True b. False

10. *When presented, the Medal of Honor is usually*

a. Pinned on the upper left coat pocket
b. Pinned on the upper right coat pocket
c. Hung on the recipient's neck, suspended on a ribbon
d. Pinned above the left coat pocket

11. *How far below the top of the shoulder seam should the Air Forces shoulder sleeve insignia be worn*

a. 1 inch c. 1½ inch
b. ½ inch d. On the seam

12. *The wing span of a B-24 is*

a. 85½ feet c. 110 feet
b. 210 feet d. 175 feet

13. *Grease and oil must never be allowed to come in contact with oxygen equipment*

a. True b. False

14. *A wind sock is*

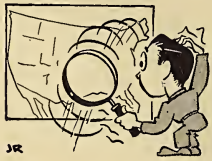
a. Worn by Arctic airmen
b. A tow target
c. A wind direction indicator
d. A pitot tube cover

15. *A theodolite is used by*

a. Pilots c. Meteorologists
b. Navigators d. Mechanics

16. *A Navy flying officer with two broad gold bands on his sleeve is equivalent to an Army Air Forces*

a. First Lieutenant c. Major
b. Captain d. Lieutenant Colonel



17. *Morrison Field is located in*

a. California c. Texas
b. Florida d. Arizona

18. *A profile interrupter*

a. Automatically switches from full rich to lean mixture at the proper time
b. Prevents a turret gunner from shooting into the tail, the propeller or the other surfaces of his own plane
c. Cuts off the oxygen supply on reaching the ground
d. Prevents a mechanic from putting too much air in the tires

19. *What is the British name for this airplane?*

20. *What is the British name for this airplane?*

HE'S REALLY QUITE A MAN!

By Colonel Harold R. Harris

COMMANDING OFFICER, DOMESTIC TRANSPORTATION DIVISION, ATC

The Air Carrier Contract pilot wears a different uniform, but it pays to respect him for the vital job he's doing.

THE next time an airplane comes taxiing up to the ramp at your station and the pilot steps out wearing a uniform with stripes on the sleeves or bars on the shoulder straps of his shirt and with a cap insignia bearing the letters "ATC" don't ask him as a soldier did recently at one of our South Atlantic bases, if he is an officer in the Australian Tank Corps.

You'll be seeing this uniform a lot from now on all over the world. It is approved by the War Department for the civilian crew members employed by the commercial airlines under contract to the War Department. Together with Army crews, these men are flying cargo, mail and passengers and are training aircrews for the Army Air Forces Air Transport Command. To be technical, AAF Regulation 40-4 calls them "Air Carrier Contract Personnel."

Step up and get acquainted with one of them. You'll find he is quite a flyer, usually as good a story teller and a nice guy with it all. And although retaining his civilian status, he has earned the right to wear that uniform, just as much as any man in the Army Air Forces.

Because today the Air Transport Command is flying to places that yesterday were only names on a map—in India, the Arctic and China, over North Atlantic, South Atlantic and South Pacific, to give you a general idea. And these pilots of the Command have a personal acquaintanceship with the monsoon in the Far East, the sandstorms of the Sahara and the milky fog of the Arctic.

Remember the first time they turned you loose on cross country down there at Randolph or Ellington or Maxwell? Okay then, just imagine how these pilots feel when the Air Transport Command has orders for a delivery of high priority material to some lonely mountain airport halfway around the world.

As one chief pilot expressed it the other day at New York's teeming La Guardia Field:

"A year and a half ago our company made its first flight from New York to Mexico City. For a month before the scheduled departure everybody in the company from the president on down was in feverish conference to iron out the details. Recently I got orders to survey a route to India for the Army. A couple of days later I went out, cranked up and took off. There weren't more than a handful of people who knew anything about it. They were all too busy sending planes to other remote spots to care about a new route that in ordinary times would have been enough to give everyone the jitters for a month of Sundays."

The next time you meet one of these pilots take a good look at him. He was probably flying the mail or barnstorming passengers off golf courses when you were reading Boy's Life and wondering if you could talk the old man out of fifty cents to buy some balsa wood for that new model airplane you were building.

Like most of them, he probably has a minimum of 2,500 hours of flying time, with the average being in the vicinity of 4,000 or 5,000 hours. Stack that up against the average of 300 or 400 hours for the Army Air Forces pilot.

Chances are he is a reserve officer and that he graduated from Kelly and Randolph back in the twenties or early thirties, when they really braced you, mister. Nine out of ten have applied for active duty and been told by Uncle Sam to stay put. They are more valuable where they are, flying vitally needed supplies and personnel to combat areas and training new aircrews here at home.

As an ATC man he has his own status in the organizational picture of the Army Air Forces. All air carrier contract personnel are directly responsible to the Commanding General, Air Transport Command. When they are in the field they are subject to military law and in the event of capture by enemy forces air carrier contract personnel are entitled to be treated as prisoners of war. To assure this status they are being provided with official War Department Certificates of Identification.

Pilots, navigators, division managers, station managers, assistant station managers and all personnel of equivalent responsibility will be accorded the same privileges as commissioned officers with regard to accommodations, transportation and messing, both within and outside the United States.

Listen to some of the stories these men can tell as they sit around of an evening.

Like the old timer who returned recently from way above the Arctic circle. He had to make a forced landing on a frozen lake in the wilds of (Continued on Page 24)

Our Pacific Sky-Lane

By Major Charles E. Shelton

7TH AIR FORCE

ONE blacked-out Hawaiian midnight in January of 1942, three B-17s were wheeled out of bomb-scarred hangars at Hickam Field and rolled to the edge of the mat. Flight crews, guided by dimmed flashlights, approached the ships. The feeble rays of their lights played on engine nacelles, ran up and down landing struts and across all movable parts of the huge planes.

No item of inspection was slighted. It was a thorough, last-minute check, for the planes were about to take-off on a trip that would require top-flight performance. Theirs was to be the inaugural flight of a new trans-Pacific war-time ferry route for the Army Air Forces.

One by one the Fortresses taxied to the end of the mile and a quarter strip. For a minute or two they sat there, the roar of their engines rising and falling as the pilots —Captains Hobson, Hewes, and MacPherson—warmed up the motors and checked their instrument panel. Then they turned into the wind. The first plane started its run, gathering speed. In a score of seconds the control tower clicked past the wing tip. As it reached the last hangar the Fortress lifted and moments later passed low over the ghost town of housing units that cluster alongside the Kamehameha Highway leading to nearby Pearl Harbor. Planes number two and three followed in quick succession.

They were on their way to the battlefront in Java, hopping southwestward via a string of Pacific islands and atolls most of which had never before seen a land plane. Only Kingsford-Smith, fourteen years earlier, had ever made a similar trip. Actually, the two flight lines would differ by hundreds of miles of latitude most of the way.

Only a few Army men saw the Fortresses take off. A handful of officers — the late Major General Clarence L. Tinker, Commanding General of the Hawaiian Air Force; Colonels Albert K. B. Lyman, B. L. Robinson and Bob Fleming of the Corps of Engineers, and Colonel Gordon Blake of the Air Forces watched as the blue exhaust flames of the B-17s moved out over the cane fields, turned across a darkened, sleeping Honolulu, then out to sea across Diamond Head. After the sound of the motors died away into the night one of the men said, "Well, there go the first planes on the long road to Tokyo." Someone mentioned that "The Road to Tokyo" would be a good name for the war-baby.

General Tinker had his own thought on the subject, and since the name he offered was a good one and since he was a General, his suggestion stuck. "I believe we ought to call it The Southern Cross Airways," he said.

AND, thus, without fanfare, was born the aerial sky-lane that today rivals the North Atlantic Newfoundland-British Isles run and the South Atlantic Natal-Africa routes in strategic importance. The Pacific line has been opened more than a year, yet most of its operating details are strict military secrets. Most of the bases the planes use have never been mentioned in public print in connection with the route; many of the alternate fields — some of them nothing more than clearings in a coconut grove, others dredged coral strips — are names that would send even a veteran beachcomber to an atlas. Most of the bases, both primary and secondary, are far out on the Pacific combat frontier. Some of the airports have been bomber, some shot at from Jap subs.

At Fiji the biggest menace seems to be mosquitoes. At one of the New Caledonia fields the native deer were so numerous they became a hazard. There's no record of a plane hitting one of them while taxiing, but the deer used to graze right at the edge of the runway. Sometimes this proved too much of a temptation for some homesick nimrod who would unlimber his .30 caliber and blaze away. It was good sport, shooting deer from a side window of a B-17 or from a parked jeep, and it made good reading in the letters back home, but it unfortunately was dangerous to the welfare of the encampment, a few eucalyptus trees to the rear of the hunting grounds. One of the squadrons, as a result, had to establish game laws, prohibiting deer hunting in camp. "Anyone wanting to shoot deer will check in with the sergeant before going out," reads the order.

Some of the South Sea airfields, except for their cane-field and coconut settings, could be a ferry station somewhere in England. P-38s sit next to ancient tow-target Vincents. RNZAF Hudsons bunk next to C-47s, De Havilands and Beaufighters mix with B-26s, and even Gypsy Moths and L-5 Grasshoppers get together.

The South Pacific route was in the planning and construction stage long before we entered the war. Early in 1941, we had one "aerial life-line" open to the Far East. It

Born of the war, this Hawaii-Australia ferry route has grown into a transport line of major importance in maintaining the long Pacific battlefront.

was the above-the-Equator Hawaii-Midway-Wake-Guam run. This route had been successfully tested by a couple of flights of B-17s that were sent to the Philippines, but it admittedly was of dubious value in case we got in a scrap with the Japs. The run was highly vulnerable, cutting across Nipponese lines of communication and surrounded by Jap-mandated bases. It didn't have much of a chance. That's why Major Roger Ramey and Captain Brooke Allen of the Hawaiian Air Force were sent below the Equator and across the date line early in 1941 to find a better lane for land planes. They traveled by PBY, steamship and fishing boat and with Dutch and Australian airmen over much of the South Seas, gathering information, maps and photos for Colonel Lyman's construction crews.

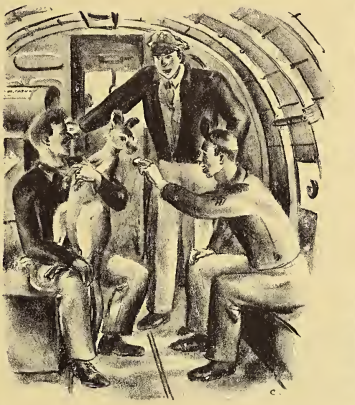
Later, another party headed by Major Gordon Blake went out from Hawaii to survey mid-Pacific islands. After the Southern Cross Airways got under operation General Tinker put Gordon Blake, now a Colonel, in operational control as his trouble-shooter, passenger agent, freight manager and communications chief. Today Colonel Blake probably knows more about Allied territory in the Pacific than any other man in uniform.

In constructing some of the bases, Colonel Lyman used British equipment and men to get the job done. The work was not scheduled for completion until mid-1942, but when the war broke out the task was rushed threefold. The pony-express air line gained operational status in record time. When the first planes went through, they refueled from 55-gallon drums and the crews slept on cots under the planes' wings. The islands were practically defenseless. The whole thing was run on a day-to-day, plane-to-plane basis in its first months. The constant threat of the advancing Japanese, the rudimentary nature of radio and technical aids for long cross-water hops, the bumpy runways, the temporary flow of supplies to the island dots, made constant personal supervision a necessity. No Army manual covered the problems that arose each time a plane took off. Yet surprisingly few planes were lost in those first days of war.

Since its rugged birth the ferry route has grown to a transport line of major importance in our successful maintenance of the long Pacific battlefront. Compared with those early trips from California to Australia, in the days when ferry pilots didn't know for sure whether the Japs would beat them to the next stop, the present traffic is doing an enormous job. Dozens of planes daily are winging over the Pacific. General Henry H. Arnold's plane holds the flight record, 35 hours and 10 minutes, from Brisbane to San Francisco. The best elapsed time during the Southern Cross Airways days was made by Consair's Captain Ted Howe, who flew from Amberly Field to Hamilton Field in 42 hours and 31 minutes. Captain McMacon, another contract veteran, has made the round trip from the States to Australia and back in five and a half days.

Types of planes that have made the Australia run include B-17s, B-24s, C-47s, C-53s, B-25s and B-26s. P-38s have made it from Hawaii to Australia. The planes are flown not only by ferry pilots, veterans of the Atlantic route, but also by Army pilots, some of whom have never flown a body of water larger than San Francisco Bay.

In its year and a half of operations the Southern Cross Airways, now the Pacific Wing of the Air Transport Command, has carried thousands of military and government passengers. Hundreds of tons of priority war cargo have been sent "down under" to the Solomons and New Guinea



fronts via this route. Not all the space, however, has been given over to G. I. Early cargo records, for instance, list one kangaroo, transported to California from Australia by Captain Haigains. A General, needing some uniform material, had some wool yardage delivered to him via LB-30. One urgent request from a wind-blown stenographer at Hickam Field for a card of bobby pins (Honolulu's five-and-dime had sold out) was filled by Hamilton Field. Colonel (now Brigadier General) "Blondy" Saunders' cigars always received a high priority on the Solomons run. Dogs, rat poison and flit guns were on the early freight lists. A bathing suit for an Australian Colonel's wife was sent from San Francisco. Some coffee percolators made a rush trip to Australia shortly after the Americans moved in, ". . . because Aussie coffee just isn't made right." Then a second kangaroo was sent up to California to provide heart interest for the first kangaroo.

Travelers who have made the long trip recall many famous landmarks, including Hawaii's Diamond Head (which, incidentally, doesn't look like much from the air). Fiji's "Handle-bars" Carriker, an Air Forces captain and genial major domo in the land of the Bula Boys, belongs in the Airways Baedeker because of his startling waxed mustache. There is the flat coral island that has its level monotony broken by one lonesome palm tree. There are the sunsets, some of the Pacific's best, viewed from the sagging canvas chairs on the veranda of the Fiji Officers' Club.

MUCH of the credit for pioneering the Southern Cross Airways should go to civilian pilots flying under contract to the United States Government and to RAAF Ferry Command flyers. Captain Ernest W. Gray of San Diego, California, is typical of the commercial skippers who are keeping Australia closely linked to the United States. Gray was a veteran of the Pacific even before we got into the war, having twice delivered British-purchased PBYs to the Philippines. He was on his way to Wake Island the morning the Japs took their stab at us. He was delivering a plane destined for Singapore and was between Midway and Wake when he got word to turn back. He spent that night at Midway, sitting in a dugout while Jap cruisers and destroyers shelled the place. Captain Gray returned to Honolulu and the mainland, but the following March found him on his way again, this time delivering a B-25 to Dutch flyers in Australia. Today Captain Gray is taking C-87s back and forth to Australia.

Captain Stan Young, another commercial pilot who was on the South Pacific run in its early days, illustrated the type of flying that was sometimes needed to get planes through from one island to another when he flew a four-engine bomber for five hours with number one and two motors out. He had a new crew on board, but his experience brought them through, despite the fact that to keep his altitude he had to heave all loose baggage and gear into the Pacific.

The record made by the Southern Cross Airways in its day and the record the ATC is making today in moving cargo and personnel foreshadow a tremendous Pacific air transport system in post-war days. A veteran flyer of the Pacific air route pointed out what it may be like when he said:

"Even under the inconvenience and uncertainties of a war we have airfields out here in the middle of the ocean that compare favorably with many metropolitan airports in size and ability to handle traffic. After the war — after we beat the Japs — there will be so many planes flying across the Pacific that it will look like the vicinity of a training field. From the States to Australia in thirty hours or less, and to the Philippines or China in a day and half. As for Japan, she probably won't be worth flying to." ☆

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

"GET THE JOB DONE"

By Lieutenant Gordon H. Coe

IT WAS a cold gray morning in February at an American bomber base on the Tunisian front. Shivering groups of men, flying crews and ground men, lined the south edge of the field watching the sky to the east.

Tiny specks that soon grew to be planes appeared on the horizon. Anxious eyes counted them, then an excited voice shouted: "I count nine. They're all back!"

A buzz of relieved conversation and then the planes were circling to land. B-26 Marauders, coming in low and hot, like they always do.

By the time the last plane had landed, the Major who had led the flight had been picked up in a jeep and whisked back to the operations tent.

"Ran onto a big Axis convoy out there," he said to the eager crowd around the tent. "We got two ships, but they sure threw the flak at us. My wings look like a screen door."

Already the operations officer was on the phone giving a brief description of the raid to higher headquarters. Suddenly, he put the phone back in its little leather box.

"We're going back after the rest of that convoy," he announced. "This is one they've been waiting for, and it's carrying a lot of important stuff. Every one of those ships that gets through now may delay our cleaning up Tunisia by three weeks.

"We'll use different pilots and crews, but we'll have to put most of those same planes in the air again."

The operations officer called for the group engineering officer, Captain Warren S. Bradford of Kingston, Massachusetts.

"Get at least six of those ships that just landed ready to go on another mission early this afternoon," he said.

"Yes, sir," said Captain Bradford.

Bradford hurried out to the planes where squadron engineering officers, aircraft inspectors and mechanics were looking over the damage done by Axis marksmen.

He delivered the news of the new mission to Warrant Officer George O'Dell of Missouri, an engineering officer, and Master Sergeant Howard S. Scott, Jr., of Fort Worth.

"But some of these ships have got a lot of flak holes, and we've got no metal to patch them," protested Sergeant Scott. "It's in some of that equipment we haven't been able to get shipped up here yet."

"We might put three in the air without any work, but at least three will need patching," explained O'Dell.

"Then put all your men on those three and find something to use for patching, anything you can find," said Captain Bradford.

It was several hours later when a G. I. truck loaded with flying crews, colorful in their yellow "Mae Wests" and white parachute rigging, pulled up to the planes.

Ground crews were just ending their work, putting on finishing touches. A pilot walked over to a little knot of mechanics.

"Say, what did you use to patch those flak holes in this plane?" he asked.

"I patched some with the bottoms of five-gallon gas tins," said Tech. Sergeant John D. King of Fort Worth.

"I used linen patching," exclaimed Tech. Sergeant Harry C. Engle of Chicago. "It was the kind of patching they used on fabric planes before they made them of metal."

"Holy smokes," exclaimed the pilot, squinting at a patch. "Will they hold?"

"Sure," said Sergeant King. "Maybe not for months, but for a few weeks, anyway."

"I'll take your word for it," the pilot remarked as he turned away.

And in a few minutes another formation of B-26s headed for the Mediterranean "hot spot" between Sicily and Tunis to knock out more of the shipping needed by the Axis to supply its Tunisian forces.

That was just one dramatic example of the way ingenuity and hard, grueling work by Army Air Forces ground crews during the early days of the Tunisian campaign kept planes in the air despite hardships and handicaps, and helped lessen German "staying power" in that vital theatre.

Moreover, it's an example of what mechanically adept American boys are doing to keep planes flying all over the world. Their motto is: "Get the job done." If vital supplies go down on sunken ships or are delayed by difficult terrain and bad weather, then something else will have to do until the supplies arrive.

NOTHING is called impossible until it's been tried and proven so.

Seldom, if ever, has more been done by an air force group with less equipment than by the B-26 outfit about whom this story is told.

"Yet we actually maintained our ships for a long while with little more than a screwdriver and a pair of pliers," said Warrant Officer O'Dell.

"Because of the nature of the campaign, we began operating in the African theatre long before we expected to start," he explained. "Much of our tools and equipment were still in England, and replacements were hard to get in Africa then.

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

Ground crewmen of this B-26 group in Tunisia scored a victory with screwdriver, pliers and a patch of tin.

"Things are well organized here now, and most new groups coming over are pretty well equipped when they land. But, of course, there is still plenty of chance to improvise, and it will never be like aircraft maintenance in the United States.

"A kit with between 100 and 200 special tools is considered the minimum with which to maintain airplanes of our type back in the States," O'Dell continued. "Yet, I remember one day when two of our crew chiefs (Tech. Sergeant Harry F. Beals of San Antonio and Staff Sergeant Robert E. Farnsworth of Akron) set out to repair a plane and get it into the air with only a pair of diagonals, a crescent wrench, a screwdriver and a pair of pliers to work with."

Sometimes there was only one tool of a special type in the whole group. That meant hours of waiting by one crew while another used the precious tool. It meant miles of walking every day, too, for the planes were widely dispersed to avoid being a good target for Nazi bombers.

Spare parts were non-existent in Africa in the first months of the Tunisian campaign. So, when an airplane came back from a mission too shot up to be used again or had to make a "belly" landing, mechanics swarmed over it like vultures. Shot-up planes served as "warehouses" of spare parts for airplanes still able to fly.

An important part of working on an airplane engine is being able to reach it, but those handy metal crew chief stands on which mechanics stand while at work weren't available when this outfit went into action.

"Mechanics stood on barrels, balanced on flimsy sawhorses and hung precariously from wings to work on engines at first," O'Dell recalled. "Then we found that one of the flight chiefs, Master Sergeant Hubert J. Treille of New Orleans, spoke excellent French. From a nearby French army unit, he got some big window frames, and we made some crude stands from them. Even then we didn't have too many, and it was a major tragedy when a bomb got two of our five stands and two tool kits one morning just before dawn."

Changing tires on the big planes looks impossible without the big wing and nose jacks that are standard equipment in the Air Forces. Yet it was done dozens of times by ingenious ground crews.

To change a nose wheel tire, they raised the nose by having ten men get into the tail of the plane. Then fifty-gallon oil drums were placed on either side of the nose with heavy timbers between them to support the nose. With this accomplished, the nose was lowered onto the timber supports by having one man at a time come forward out of the tail.

"Once the plane was jacked up like that," said O'Dell, "we'd cross our fingers and hope another plane wouldn't taxi by too close and blow it off the blocks with its prop wash."

To change a main landing gear wheel tire, the men would block up under the wing to keep the tire up, then dig a hole under the wheel. After the tire was changed, the plane had to be taxied out of the big hole. They nearly burned up the motors occasionally but planes were always ready for their missions.

Improvisations were the order of the day. They were so common nobody even discussed them.

There were no air compressors available, so tires were pumped up with a compressor on a British army gas truck. The men had to wait for an American transport plane to land at the field if they wanted to pump up the landing gear shock absorbers. The transports carried booster pumps.

Mechanics "borrowed" an old French battery charger to keep up batteries. Several times, bullet holes in the self-sealing rubber fuel tanks on the planes were repaired with a tire patching kit from a G. I. truck. The patches last several months, too, although 100-octane gas eats up regular rubber cement.

Auto-wrecking trucks were used to change the big, 800-pound propellers on the B-26s. But ten men had to exert all their strength to raise the prop the last few inches because the wrecker's winch wasn't quite high enough.

Welding and soldering were out of the question until a French construction company arrived to enlarge the air base. Sergeant Treille was pressed into service again, and soon the contractors were doing all the welding and soldering for the group.

For a while the big gas tanks on the planes had to be filled by hand from five-gallon cans—an endless, back-breaking job. Later, small British gas trucks with hand pumps were used, but all the gas from these trucks had to be strained through a chamois-skin held by hand. American automatic gas-tanker trucks finally relieved that problem.

Once an air-oil strut was found to have a crack in it. Sergeant Treille got the French contractors to solder it—something unheard of in plane maintenance in the States—and the strut is still holding.

The lack of tools and equipment also affected the armament and ordnance crews. Ordnance men often worked most of the night in the freezing cold and under a strict blackout to load bombs for the daily missions.

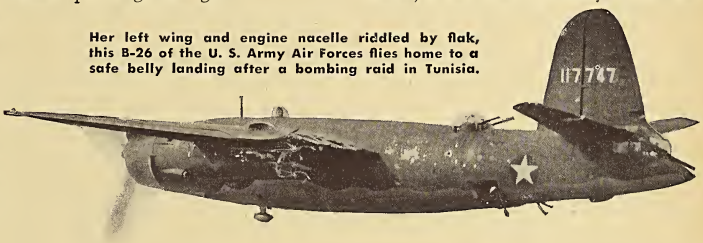
BAD weather was a thorn in the side of the ordnance crews in more than one way. If bad weather caused cancellation of a flight for which bombs had already been loaded, those bombs had to be taken out of the bays—always a ticklish job—and another type loaded, because a change in targets usually meant different types of bombs would be used.

Loading and unloading bombs in the pitch-black cold of an African winter night was a job that called for steady nerves. But no mission ever failed to go out because bombs were not loaded. Ordnance crews headed by Captain Herbert Hartman of Newton, Kansas, are proud of that record.

Armament men who maintain the deadly .50-caliber machine guns on the B-26s also did their jobs well without full equipment.

"If you keep thinking that if a gun isn't in perfect condition it may cost the life of one of your buddies, you'll always find a way to keep that gun in shape," explained Lieutenant John R. Campbell of Stanton, Tennessee.

In all, the record of this one outstanding medium bomb group shows that the Army Air Forces' careful training program, plus Yankee ingenuity, pays off in seemingly impossible feats in the field of operations. ☆



Her left wing and engine nacelle riddled by flak, this B-26 of the U. S. Army Air Forces flies home to a safe belly landing after a bombing raid in Tunisia.

One day during a period of bad weather, the group was asked to bomb an Axis airfield near Tunis despite the adverse flying conditions. Pilots were willing, but the vital rubber de-icer boots on some of the planes were in bad shape and needed patching. For an hour the whole group was at a loss as to where the necessary rubber, scarce even in the States, could be located in Africa.

Finally a young mechanic hit on the solution. Several rubber life vests were torn up, and the rubber used to patch the de-icer boots.

The mission went out on schedule, caught thirteen Axis fighter planes on the ground and destroyed them. All our planes returned safely through an icy overcast—thanks to some worn-out life vests.

HAVE THE BEST CREW OF THEM ALL

IN THE DRIVER'S SEAT

By Capt. William J. Crumm, pilot

WHEN you've got your B-17 bouncing and weaving over Europe like a bucking steer, dodging hellishly close flak and giving your gunners a crack at swarming enemy fighters, you realize for the first time just what they meant back in O.T.U. when they told you a good crew was the most important element in combat bombardment flying.

Old "Jack the Ripper"—that's what we called our B-17E—was saved from many a plastering simply because the sharp eyes of our gunners detected an enemy fighter slipping in from out of the sun, or judged the accuracy of flak almost before the stuff began popping. We hit many a target on the nose because our bombardier knew his stuff and wouldn't allow all the shells and machine gun bullets in the world to distract him when he was lining up his sight during a bombing run—and, because our navigator could hit a landmark on the head almost with his eyes closed.

We honestly believe we have the best crew of them all. And we know that other crews think they're the best. That's the way you should feel. Not cocky. But knowing you are the best because hard work and confidence in each crew member has made you the best. We don't have any individualists in our outfit. If you have a man playing for himself get rid of him because he can ruin you in combat.

You usually will know between four and five o'clock in the afternoon when you are to take part in a raid the next day. On the morning of the mission you are aroused between 4:30 and 5:30 for breakfast and detailed briefing.

About an hour before take-off time, the pilot and co-pilot report to the ship and personally inspect the engineering, oxygen equipment, ammunition, guns, parachutes, life vests, clothing and first aid kits, and they talk with the other crew members. To me this inspection check is the most important duty of the pilot. Failure to do so may lead to unnecessary turn-back and even loss of personnel.

Once in the air and after leaving the coast of England, your gunners should test fire their guns. If a gun is out and continues to function improperly after a check-up, the pilot must then maneuver his ship in the formation to assure maximum coverage of the "dead spot" in the firepower.

A turn-back due to gun failure results in a weakened formation and exposes the single returning aircraft to intense enemy attack. I know of several instances where a returning ship has been surprised by enemy fighters and shot down. The wise pilot makes it clear that he does not intend to turn back because of gun failure or oxygen trouble so the crew will be kept alert and careful to check on all details prior to take-off.

From the time you leave the English coast, your ship is in constant danger of enemy attack. Your gunners must stay mentally alert and keep on the lookout for fighters. It may take only one burst from an enemy fighter to raise havoc with your plane. On several occasions we were attacked in mid-channel on the way over.

Whenever there's a lull in activity keep the crew chatting over the interphone. Talk about anything. This is one sure way to keep the boys on their toes.

Impressions gained by crew members of a B-17 during eleven operational missions over Germany and Occupied France.

Once over the European Channel coast, the fireworks usually begin. Sometimes the enemy will throw up light flak at first. This flak is white in color, and white puffs usually indicate flak with an effective range of about 15,000 feet. This was always beneath us. Now and then enemy batteries will throw up flak with pinkish bursts apparently for psychological effect and as deterrent fire. Flak with black puffs is the heaviest and is effective up to an altitude of about 35,000 feet.

Unless you are going on raids deep into France or Germany, you seldom encounter fighter opposition until you are fairly near the target area. We found this particularly true when bombing submarine bases along the French west coast.

Enemy fighter tactics, as far as our experience is concerned, differ decidedly over France and Germany. In our first raids over Germany late last fall, fighters attempted to press head-on attacks but they seemed to lack the experience and finesse of the older pilots we later met over Western France. After several unsuccessful attempts at head-on attacks, they would revert to attacking the tail and beam, coming in from either side. Fighters seldom used the sun to advantage in our raids over Germany.

In Western France the attacks almost invariably came from between eleven and two o'clock. The fighters—mostly Focke-Wulf-190s in Western France in contrast to almost all types in raids over Germany—would climb and fly parallel to our formation at a distance of some 1,500 yards, just out of range. They usually approached in groups of four, flying in trail. They would fly out in front of our formation about two miles, then peel off and come in head-on, the rate of closure being about 600 miles an hour.

It was at this point that we could distinguish between an experienced pilot and a novice. The veterans would close in to within 200 or 300 yards before firing and if they were too close for a safe break-away, they would fly directly through our elements. You could almost count their whiskers on occasion. A standing comment on returning from a raid in Western France was: "I saw the guy with a red mustache again today." They came that close. Otherwise, the veteran's tactics were to roll over and dive straight down beneath the formation, exposing themselves to our gun fire for the least number of seconds.

Newer pilots, on the other hand, very often failed to bring their guns to bear because they would misjudge and overshoot our entire formation. Or else they would break away before they were within effective range, sometimes without even firing a shot at us.

We found that the most effective type of evasive action taken in formation against these enemy fighters was to dive into the attackers. This would increase the rate of closure, throw off the fighter's line of sight and at the same time give our top turret gunners a crack at them.

In a situation like this a pilot has a three-fold job. He must fly a good formation, which, I might add, is the best life insurance in the world. German fighters always go for the loose formations when they can find them, and a straggler really catches hell. Secondly, the pilot must know the direction of the attacks. And, then, he must maneuver his ship to bring as many guns to bear as possible. A good interphone system is absolutely essential if he is to accomplish all three jobs, for there must be split-second communication between all crew members.

Not only does he fly in a good formation but a wise pilot takes individual evasive action. He changes elevation, skids, trying at all times to bring maximum firepower to bear against attacking planes. However, he must keep his relative position in the formation—and tight—to avoid lagging behind.

Evasive action must be continued after the turn on the target from the initial point, which is usually about five minutes away, up to the time the actual bombing run starts. Then it is up to the pilot to fly as level as possible, making any corrections in formation smoothly, in order to keep the gyro in the bombsight from "spilling."

Violent evasive action is frequently necessary both before and after a bombing run. In a raid on the submarine installations at Lorient on January 23, evasive action was the only thing that saved us at one or two stages of the mission.

The trip home is usually every bit as rough as the trip in, sometimes rougher. So don't let your men relax for a second. The pilot must fly a good formation until he peels off into the traffic pattern at his home field. Other crew members should keep on their toes right with him.

Remember a well disciplined, hard-fighting unit is hard to beat. Train your crew to be able to cope with any situation without losing their heads and you'll have very little trouble in combat.

NAVIGATING OVER EUROPE

By Lt. William C. Leasure, navigator

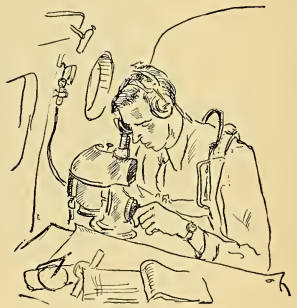
The many tasks that fall to the lot of the navigator on combat missions are difficult to realize until he actually gets in the fight. At least, that's the way we found it in England.

You realize, of course, before you go out for the first time that your primary job is to get the plane over the target and back home again. But in many respects, accomplishing this from a base in the British Isles is anything but the simple application of training received back home.

For one thing, we found that precision pilotage is the mainstay of navigation in the British Isles and the only navigation method which gives the accuracy needed for successful precision bombing. It is imperative, for instance, that the navigator know where he is at all times, frequently within one-quarter of a mile.

Navigators and bombardiers in O.T.U. who may see service in England should obtain all possible practice in pin-pointing at altitudes of 20,000 feet and up—and from 1,000 to 1,500 feet. Most of our flying was done at one or the other extremes.

On the average mission it is the job of the lead navigator to find the target and for the most part he employs pilotage. Wing ship navigators do not have to be so



exacting although they should always know within a few miles the position of the formation. Even during the run from the base to the British coast, you must keep the other crew members informed over the interphone as to their whereabouts. And it is wise to follow this procedure whenever possible throughout the flight. Such information as your location, the time when approaching the enemy coast, when enemy fighters may be expected and when the target is being approached proves a great aid to morale and tends to aid in welding the crew together as a team. This should be a primary function of the navigator.

I might add that all hands should be notified on the return trip just when friendly fighters may be expected. This prevents firing on your own pursuit planes.

The bombardier and navigator should know each other well and work together perfectly. At altitudes from which we operated, the target could usually be seen 20 to 40 miles away. When you spot the target you should point out to the bombardier a landmark near it so he can use pilotage in lining up for the run. It is your job to give him a heading that will require very little drift correction.

During the last ten minutes on the target approach, interphone silence is generally observed by all but the navigator and

bombardier. We found that this prevented needless confusion.

If attacked by fighters during the bombing run, the navigator takes over both his and the bombardier's guns, firing from whichever station will best meet the attack. When the bombs are away, it is the navigator's duty to note the time, heading, altitude and air speed. He also must determine hits and damage, obtaining reports from other crew members. The ball turret operator is especially well situated to report on damage.

During action—or at any time on a mission, for that matter—the navigator must note on his log any of our planes seen to go down, the time, location and whether anyone was seen to bail out. Reports of enemy planes shot down also must be reported by crew members to the navigator who enters the information in his log.

Although a navigator has his hands full the entire trip, the time spent near the target is a particularly busy one for him. After bombs are away and the plane is turned about on its home course, the navigator must take care to remember flak installations and avoid them. With the lead navigator pacing the formation homeward, wing navigators have plenty of time for shooting in the case of enemy fighter attack.

Every navigator should learn his gun as well as the theory of sighting. Tracer firing is deceptive and not very satisfactory. Each navigator cleans his own gun in combat theatres and in this way gets to know exactly how it operates and just what to do in the event of stoppage.

Although they have more time for firing on the way home, all navigators in a formation should know within a relatively close margin what their position is because one of them may have to take over the lead navigator's duties if he is wounded or the lead plane shot down. From the British coast to home station ALL navigators must know their position to within a quarter of a mile, not five or ten. All England looks alike and any one of the navigators may be required to take over the formation at a moment's notice. Moreover, it is particularly important to know your exact position at this stage since sometimes there are wounded men aboard your ship or other ships and no time should be lost in needless guesswork. Ships which have injured men aboard shoot a red flare and are permitted to land first.

Your job is by no means over when your ship rolls to a landing. In the interrogation by intelligence officers the navigator is a key man for he has kept in his log a complete and exact story of the mission.

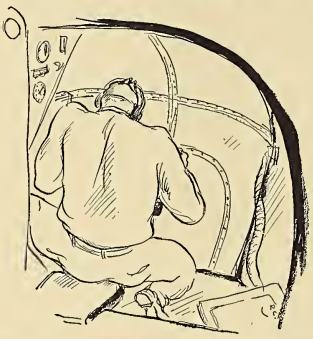
HITTING THE TARGET

By Lt. Robert L. Kleyla, bombardier

WHEN you have your eye glued to that bombsight and are making ready to shout, "Bombs away!", you can't let a little thing like exploding flak and enemy fighter planes bother you too much. But the moment your load is dropped, you can grab your gun and start shooting.

That's just about the size of a bombardier's job over a target in France or Germany. However, unless he does his primary job well, the bombardier wastes a mission, and a lot of good men and equipment have been exposed for no good reason.

Before you leave on a mission it's your job to have a clear mental picture of the target you are supposed to hit. If you don't it's your own fault. At briefing you get a complete run down on the prospective trip



over the Continent. You know the size and number of bombs, the route in and out, weather reports and the zero hour or time for crossing the British coast on the way out. The group C. O. projects on a screen maps of the target section and pictures of the target itself. The bombardier is informed of dummy installations, ways of avoiding them and hitting the real target.

IN addition bombardiers get together later for a special briefing, during which they may request maps and pictures of the target area to be flashed again on the screen. They are given the opportunity to recheck the meteorological officer for such data as ground, air and mean temperatures at the target, and pressure tendencies in the target area.

By the time the bombardier visits the bombsight vault to get his sight, he should know all the information available on the target for the day. Before take-off, he should check the bomb load, his sight, the bomb racks and bomb bay doors, switches and any other equipment he might use on the flight.

In order to insure proper performance of his secondary job—that of shooting enemy fighters—a bombardier should check and recheck his gun before the mission.

As your ship gains altitude on a mission, you convert all data obtained from the metro officer. During the early stages of a flight, I also made a practice of memorizing some of the bombing tables so that if we failed to approach the target under exactly the conditions given at briefing, corrections could be made quickly and without confusion. I generally marked possible variations in pencil on the disc drum so they could be made with the least amount of trouble. By setting all the values possible in the sight at this time, you have more of an opportunity to man your guns.

A bombardier should learn pilotage well, particularly from higher altitudes. This knowledge can be put to valuable use when the navigator gives you a landmark near the target after you have approached to within 30 or 40 miles. On reaching the advance initial point in the target approach, the bomb bay doors are opened. This is done for two reasons: Enemy fighters are unable to ascertain which target is our objective (there usually are several potential ones in any given area), and the pilot is given a chance to correct for air speed and altitude with the doors opened.

In making a bombing run in formation (which is usually the case), the lead bombardier sights for deflection and range; the wing bombardiers, for range only. Then, too, wing bombardiers may drop either on the lead bombardier or by their own sightings, depending on instructions at briefing.

It is your job to observe results whenever possible and to obtain reports from other crew members. At times you carry a camera. At least two or three ships in a formation are equipped with them and most of the time they are operated by the radioman on instructions from the bombardier.

On returning from a mission the bombardier supplies the intelligence officer with the number and types of bombs dropped, fusing data, results observed, altitudes, time of attack and the like.

All during our experience on combat missions over Europe I was particularly impressed with the value of plenty of high altitude bombing practice by the bombardier. Get in all you can in training because it is sure to pay off in bulls-eyes later. In addition, you can't get too much gunnery training. Learn how to sight properly and know the nomenclature and the action of your guns so you can feel you are getting the most out of the shots you are sure to have at enemy fighters.

The bombardier's got a hot seat on any combat mission but to me it's the best seat of them all. You get a peculiar feeling when the flak starts popping almost under your nose and the fighters come in so close you begin to think they want to roost in your lap, but it's all worth it when you drop your bombs where they'll do the most good.

RADIOMAN IN COMBAT

By Tech. Sgt. Peter F. DeBoy, radioman

IN ENGLAND the radio operator isn't a passenger any longer. Combat has given him an important twofold job.

On operational missions from the British Isles he maintains radio communication while over friendly territory and in doing so serves as a valuable second to the navigator. Away from the British coast, where complete radio silence is observed except in emergency, he is a gunner—and may become an all-purpose one.

(Continued on Page 40)

The Army-Sikorsky helicopter takes off from a moving tanker. Right, landing again on deck.

The Helicopter Gets Sea Legs

An Army-Sikorsky helicopter recently made approximately 24 take-offs and landings on the deck of a moving tanker on Long Island Sound, marking the latest step in the military development of this wingless aircraft.

Colonel H. F. Gregory, the Air Forces' helicopter expert (author of an article describing the military possibilities for this type of aircraft in the March issue of AIR FORCE), piloted the ship in the demonstration staged at the request of the War Shipping Administration as a potential means of combatting enemy U-boats.

The Long Island experiment was conducted from the tanker's deck, which offered a space 78 by 48 feet for take-offs and landings. Immediately fore and aft of this space were housing and mast superstructure, leaving only side and vertical approaches.

The first take-off and landing were accomplished with the tanker comparatively motionless, but for the remainder of the demonstrations the vessel was under steam up to maximum speed.

Colonel Gregory, who has been the project officer for the development of the helicopter at Wright Field, not only took the ship off, flew away from the tanker for some distance, returned and landed but also demonstrated the ability of the helicopter to hover above the tanker and land in different positions, on the deck space.

With the tanker under full steam, the Army-Sikorsky helicopter demonstrates its ability to hover nearby.

The helicopter was equipped with flotation gear which permitted Colonel Gregory to make two successful landings on water near the tanker. The ship can land on a deck as well as water with this equipment since there is no roll of the helicopter on landing. This factor was further demonstrated by three flights, each with a passenger, from the tanker to shore and back again.

The flights took place over a period of two days, with representatives of the Army, War Shipping Administration, the British Royal Navy, the British Air Commission, the Coast Guard and others among the witnesses.

Engineers and pilots of the Materiel Command at Wright Field had recently completed the experimental testing of the machine. Since last summer, take-offs and landings had been made from a comparatively small raised platform, so it was no problem to carry on the same type of flights from a ship's deck. The only difference came in the movement of the landing area, and this factor offered no obstacle, in view of the helicopter's ability to rise and descend vertically; fly backward, forward and sideways; spin like a top about its vertical axis, and hover motionless in the air.

Incidentally, the Long Island Sound demonstration added two more "firsts" to the list held by the Army's helicopter: the first take-off and landing of a helicopter on a ship deck and the first helicopter ship-to-shore ferry service. (Continued on Page 18)

Rear Admiral Howard L. Vickery, vice chairman of the Maritime Commission and Deputy War Shipping Administrator, issued the following statement in Washington after the demonstration:

"Under the circumstances existing at the time of the demonstration of helicopters' ability to take off and land on the deck of tankers, the United States Maritime Commission and the War Shipping Administration believe that the feasibility of the operation has been sufficiently proved. These agencies are now preparing a plan for a small deck to be installed on Liberty ships without interfering with the cargo arrangement, which will permit helicopters to be used at sea, thus giving the ships added protection from submarines."

Clover Seed Cleaner

Clover seeds are speeding up the cleaning of pistons and cylinders in the engine repair shops of the Sacramento Air Depot, California. It's the idea of Frank Perry, civilian aircraft mechanic. The seeds, which will not clog up delicate machinery parts, are blown against the parts to be cleaned by a small sand-blasting machine.—**PRO, McClellan Field.**

Shorty **Slim**

Manikins for Plane Designing

Just as a tailor fits a suit to an individual, AAF engineers are now fitting airplanes to the men who will fly them. Aerodynamic design comes first but no longer are the tall men or the short men ignored in designing turrets, cockpits, emergency doors and passageways.

Three synthetic men—transparent plastic manikins—now are influencing design of aircraft installations to a greater extent than any other three men in the country. Each is an average sized pilot, representing the tallest, the shortest and the medium of 2,954 cadets formerly at Kelly and Maxwell Fields.

These three silent men already have been responsible for changes in some installations of production model aircraft. Turrets, for example, have been modified in the last three months to give air crew members more room for effective operation of their guns. Upon the recommendations of the "human engineers" who fathered the manikins in the Wright Field Aero-Medical Research Laboratory, practically every type of ball and top turret now has undergone alterations to give the gunners more room.

Slim represents the tall five percent of our pilots, who average six feet, one and one-half inches, and weigh 172 pounds. Shorty stands in for the short five percent, who are five feet five and one-half inches tall and weigh 140 pounds. The remaining ninety percent, who average five feet, 9.2 inches and 154 pounds, are represented by Roger.

Slim, Shorty and Roger are used as the standard yardsticks now in all plane designs. They are flexible, lightweight and sturdy and can wear flying clothes like an Esquire model.

The trio is used to solve problems of adjustable pilot seats, location of instruments where any sized pilot can see them, proper placement of controls so both short-armed and long-armed men can operate them with equal ease, and of the hundreds of equipment items involving proper eye level, adequate elbow room, height clearance, passageways and seats of proper width, knee room, cockpit roominess, and so on.

Before Slim, Shorty and Roger were created, aircraft designers were using statistics and "typical guys" working around the shop. In such cases, however, there was too much chance for human error in measurements and the "typical guy" sometimes turned out to be not-so-typical.

If an airplane crew does not have room to perform its duties efficiently in the air, the plane becomes inefficient. To get the maximum performance from plane and crew, the AAF Materiel Command Aero-Medical Laboratory inaugurated its program of building synthetic men as yardsticks for aircraft design.

In 1940 a conference between Colonel O. O. Benson, Aero-Med Laboratory chief, and Dr. E. A. Hooton of Harvard University, one of the country's leading anthropologists, laid the groundwork for Slim, Shorty and Roger. Some time later, measurement statistics of almost three thousand cadet pilots were recorded and classified. During the research dimensions of variously shaped heads also were tabulated to assist in the design of properly fitting oxygen masks.

Upon completion of the investigation the three average sized pilots were defined and head shapes reduced to seven typical forms representing 98 percent of the men in the Air Forces.

With the specifications written for the first time, sculptors were put to work making models of heads and full sized statues of the average man. Flexible manikins were molded from transparent plastics.

Now, after three years of extensive research, Slim, Shorty and Roger have been created and delegated to devote all of their time to helping aircraft designers make combat aircraft more comfortable and better adapted to efficient operation by crew members.—**Lieutenant Robert V. Guelich, Wright Field.**

Model air base in action at Chanute Field.

Miniature Air Base

Operation of a miniature model airport, 16 by 24 feet, complete with floodlights, obstacle lights, wind indicator and radio towers, is a feature of the final phase of the Control Tower Operators training course at Chanute Field, Illinois.

Technical Training Command students sit on two sides of this miniature field with

its hangars, runways, aprons and model aircraft, and communicate by radio with the student operator in the model control tower at one end of the field.

Each student, representing the pilot of a plane, has a card stating his problem, which may involve either coming in for a landing or preparing for a take-off. The student operator then has the problem of handling all planes and giving pilots necessary directions to assure safety and compliance with air traffic regulations.

The miniature was originally built by the 4th Airways Communication Regulation School at Smyrna, Tennessee, but was brought to Chanute Field where it was renovated and expanded after the course was moved to Illinois late last year.

The Control Tower Operators course is under the Department of Link Trainer and Teletype, Captain Ray D. Dallmeyer, Director. Instruction is given by First Lieutenant D. L. Morgan and Warrant Officer R. G. Phillips, both veteran control tower operators.—**First Lieutenant T. V. Watson, Assistant Public Relations Officer, Chanute Field.**

Wooden Wheels

Borrowing the idea from private airplane manufacturers, maintenance shop crews at the Sacramento Air Depot are using wooden wheels to replace rubber tires on aircraft while the planes are undergoing repair. The wooden wheels serve to protect the rubber tires from damaging grease and oil while the aircraft is on the repair line. Inspecting a wheel (below) is Clinton B. McElheney, shop superintendent in the maintenance division. **—Public Relations Officer, Sacramento Air Depot, California.**

Improved Battery Cart

An improved battery wagon has been designed and built at Barksdale Field by Staff Sergeant O. J. Naquin. It fits any AAF airplane, is suitable for field conditions, and charges its own batteries. The cart will adapt to 12, 24 or 28 volts. Made from salvaged materials the wagon is stenciled to insure correct procedure by "alert crews."—**Captain Harry B. Barnhart, Barksdale Field, Louisiana.**

Starter Wrench

To speed up the starting of nuts on bolts in inaccessible points on aircraft, Corporal Walter Ott of the Army Air Base at Casper, Wyoming, devised a starter wrench. His device is expressly designed for use on mounting bolts of inertia starters and batteries of B-17Fs.

The tool consists of a $\frac{3}{16}$ inch shaft, ten and one-half inches long and enclosed in a copper tube. At one end of the shaft is a knob and at the other a series of three gears which are turned by the shaft, thus causing a socket mounted on the third gear to rotate. The nut to be installed is placed in the socket, and the knob is turned to start the nut on the threads of the bolt. The nut is tightened with a standard wrench.—**Captain James A. Hilton, Army Air Base, Casper, Wyoming.**

Artificial Horizons

Taking off at night into a background as black as the inside of a tomb is no cinch for an experienced pilot. Add inexperience, instrument lag, a fast modern bomber that won't climb immediately, and you have a potential accident.

In fact, a recent Third Air Force study discloses that these conditions have caused crashes because young inexperienced pilots unable to compensate for instrument lag have a tendency to let a plane nose to the ground.

A solution was found that should be of interest to all bases where a similar hazard exists: Provide the pilot with ground contacts so he needn't go on instruments until he gains altitude.

A good deal of credit for development of the idea is due Lieutenant Colonels Clint T. Johnson and J. T. Winstead, Base and Group Commander, respectively, Avon Park Bombing Range, Florida.

From odds and ends of equipment a lighting system was created at this Florida base which will be duplicated throughout the Third Air Force. The system is called an "artificial horizon."

The lights were installed about two months ago following the crash of two B-26 aircraft, each of which apparently had been caused by the failure of the pilot to orient himself with the ground. There have been no similar accidents since.

The "artificial horizon" consists of six clusters of red lights fanned out at a 20 degree angle for two and one-half miles from the runway's end.

The fan arrangement was selected so the lights would remain in view of both the pilot and co-pilot as the rising nose of the plane restricted forward vision. The length was calculated to give ground contact during the first minute of flight—a period of instrument lag, cockpit activity, and low altitude operation.

The light banks were constructed of materials found around the base. Each is made up of six 200-watt bulbs painted red, strung six feet from the ground in a box shape 20 by 30 feet. Two clusters were placed half a mile out; the next two, one and a half miles, and the final pair, two and a half miles. The last two banks are approximately 4,500 feet apart.

To avoid the delay entailed in obtaining miles of wire to connect the clusters with the regular power source, the commanders decided to use portable generators. The base's aviation engineering battalion scraped together six units and provided the men to operate them.

The permanent installations will be patterned after the Avon Park model, according to Colonel E. H. Walter, commander, Corps of Engineers, Third Air Force. Minor modifications of spacing may be necessary depending on the type of plane operated at a station and strings of lights instead of clusters may prove effective at some locations, he said.

The installations will become a regular part of a field's lighting equipment, controlled by a switch in the tower.

"If we save only one bomber," Colonel Walter explains, "that's a quarter of a million dollars, not to mention the lives."—**Flight Control Command, Winston-Salem, North Carolina.**

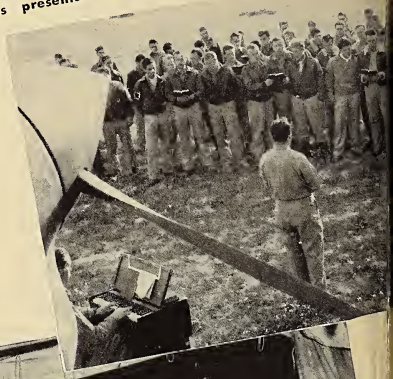
TAXI. Going to town sometimes means a jaunt like this.

PARLOR, BEDROOM and SINK

LIFE at Allied air bases in North Africa is not always one bombing run after another, nor is it necessarily a continuous round of engine-repairing and bullet-hole patching. Behind the aerial offensive against Axis targets in the Mediterranean area are hours spent in such personal pursuits as tidying up for a visit to town, matching wits with the natives, athletics, old-fashioned bull sessions, Sunday worship, dreaming of home, and the dozens of other little everyday habits that you can't take away from any guy, war or no war. The daily routine may not be accomplished in the style to which they had become accustomed, but the boys seem to be making the best of a rugged situation.

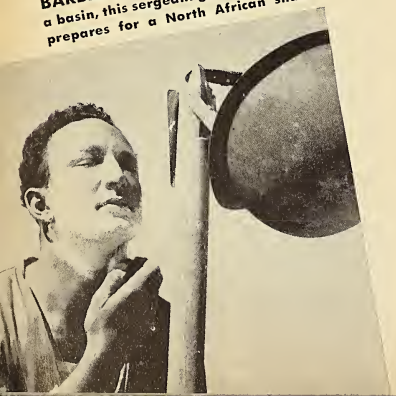
On these two pages AIR FORCE presents a series of photographs portraying the personal side of life in North Africa for personnel of the Army Air Forces. Although they were taken by AAF combat camera crews before the last Axis retreater was brought to bay on Cap Bon Peninsula, these pictures are typical of scenes enacted almost daily by our flyers and ground crewmen in this vital war theatre. ☆

SANTA CLAUS. Lieutenant Richard M. Wright, fighter pilot, gets a belated kick out of his Christmas presents which finally arrived in April.

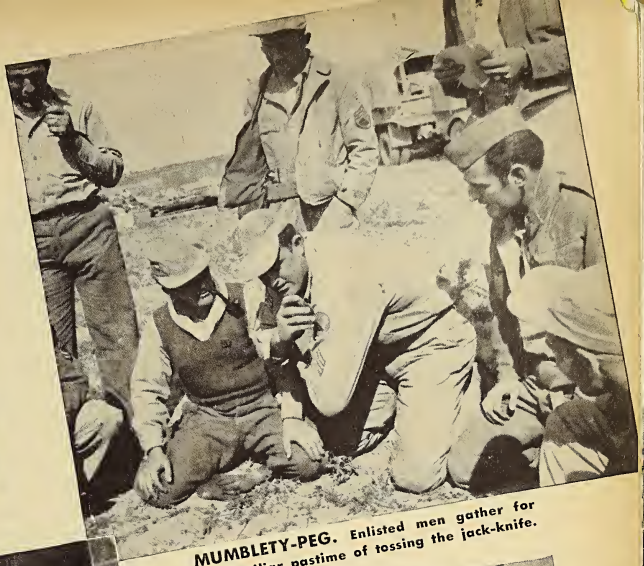


SERGEANT PEELERS. You guys who sweat over KP should enjoy this shot of a Master Sergeant skinning spuds.

BARBER SHOP. Using his helmet as a basin, this sergeant ground crewman prepares for a North African shave.

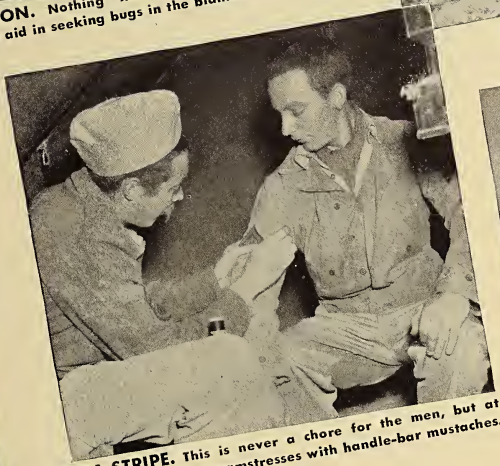


INSPECTION. Nothing like broad daylight as an aid in seeking bugs in the blanket.

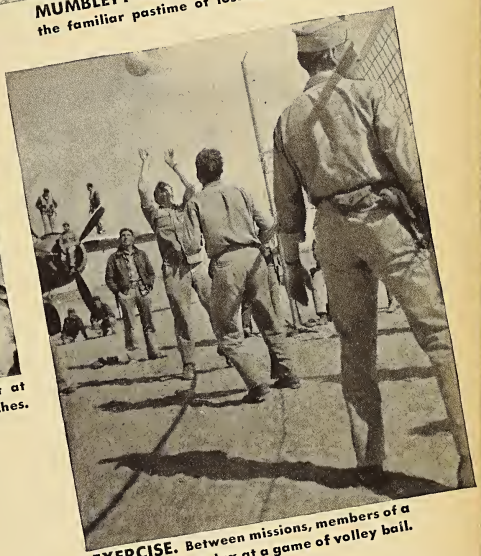


MUMBLETY-PEG. Enlisted men gather for the familiar pastime of tossing the jack-knife.

CHURCH. To the accompaniment of a portable organ, AAF personnel at a forward airdrome join in singing a hymn at Sunday services.



EXTRA STRIPE. This is never a chore for the men, but at home, you don't have seamstresses with handle-bar mustaches.



EXERCISE. Between missions, members of a bomber group relax at a game of volley ball.

SNACK. Bomber crewmen smack their lips over doughnuts and coffee, awaiting another mission.

SWEET DREAMS. Your best girl looks even better when you're operating away from home.

TAXI. Going to town sometimes means a jaunt like this.

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BARBER SHOP. Using his helmet as a basin, this sergeant ground crewman prepares for a North African shave.

EXPLODING THE Jungle Myth

". . . David Dauntless extricated himself from the twisted wreckage of his plane, only to stumble and grope into a green hell of tangled vines, teeming with insects. Unnamed terror gripped him as he faltered into the clutching net of a fearful spiderweb. Struggling to free himself, he sensed the new menace of a giant tarantula near his face. Overhead, he saw the cruel body of a boa constrictor uncoiling its lethal length. Somewhere in the bush, a jackal screamed. Cold sweat beaded on his brow as he lay helpless on the dark, steaming earth, awaiting a slow, tortured, certain death. . . ."

THESE might well be the words of backroom fiction writers who have never been near the jungle, or of publicity-seeking professional travellers who boost their stock by coloring the jungle with an aura of glamour and terror. Take the word of competent scientists and explorers with first-hand experience—it's strictly hokum!

Plenty of people, aside from the natives, have lived unromantically and without incident for years in jungle regions. Those who visit the jungle return with an almost unanimous conviction that it's a much more pleasant and safe place in which to live than most of our big cities.

The truth is that fear of the jungle, like most fears, is caused by an ignorance of the facts. This fear is largely the result of tall tales from unreliable sources. What are the jungle fears? There is the fear of animals —of snakes, crocodiles, spiders, wild beasts, bats and insects. Then there are fears of poisonous plants, of disease, of cannibals, of suffocating heat, of the impenetrability of the jungle "wall."

Let's look at the facts through the eyes of experienced naturalists and explorers who know the jungle intimately. Let's take up the "dangers," one by one, and "lay their ghosts." It is quite true that tropical jungle areas have a greater variety of animals than any other type of region but their aggregate number is relatively small. And contrary to popular notion, dangerous animals are rare and even these are timid in the presence of man.

Snakes, of course, are the number one jungle fear. The concensus among men who know is that the chances of being bitten by a poisonous snake in any tropical region are actually smaller than in many parts of the United States where rattlesnakes or water moccasins are found. Many of the tropical islands are actually free of poisonous snakes, and even where they do exist, they're seldom seen. Normally, one may expect to see only one snake a month even when wandering through the jungle each day, and the chances are that this one will not be poisonous. Scientists who go out deliberately to catch snakes experience considerable difficulty in finding them. Some years ago, a large party of some seven hundred men travelled through a wide area of New Guinea and in a year's time, not a single member of the party was bitten by a snake. Pythons may be seen but they do not attack humans; no snake of the constrictor variety in the South Pacific islands is big enough to harm a man.

Some snakes in tropical jungles are poisonous, but they are easy to avoid and ordinary precautions are sufficient. Be especially careful when clearing ground for a camp site or trail, or when gathering firewood in the brush. Don't put your hand into dark crevices or behind rock ledges. Don't walk barefooted. You'll be given detailed instruction on suitable clothing to wear to protect yourself against snakes, along with a first aid kit for treatment in the exceedingly rare event of a bite. A last word on snakes: Visit your local zoo before you depart for the tropics and have a look at the only snakes you may see until you return home.

You've heard a lot about poisonous lizards in the tropics, but they're like ghosts, often reported but never caught. The only poisonous lizard in the world is the Gila monster which lives in the southwestern United States. Large tropical lizards may look very fierce but they're actually quite harmless. If you come across a lizard when you're lost in the jungle, consider yourself lucky. It makes good eating. The smaller lizards you'll see scampering around in the forest or even in your tent are about as noxious as your maiden aunt's canary. Even if you deliberately make one bite you, its teeth aren't strong enough to pierce your skin. A mouse is a dangerous beast compared with the jungle lizard.

Man-eating crocodiles represent another much overrated danger. They're big, to be sure, but they have minute brains, very little initiative and certainly no courage. They rely for protection on their very tough hides rather than on their ferocity. As you approach them, they'll get out of your way. Only if you deliberately try to provoke or capture a crocodile will he put up a fight, and then the danger is more from the swift stroke of his strong tail than from his rather weak bite. A crocodile swallows its food whole and for this reason it won't attempt to attack any animal too large to swallow. To take on even a small man a crocodile would have to be more than fifteen feet long, a size rarely seen. Use reasonable caution; don't approach a crocodile too closely, and you'll have nothing to fear.

Now for the fable of the "dangerous wild animals." About the only carnivorous animals you'll find are in Africa; in Sumatra, Bali, Borneo and southeastern Asia there are tigers; the South Pacific has none. You'll

have to be a mighty good hunter even to see one of the big cats (outside a game reservation). Even if you should meet one, he'll make himself scarce. Large animals are dangerous if cornered or if you startle them suddenly, especially the females with young. But these are rare circumstances. Don't bother the big animals and they won't bother you.

But what of the other jungle "terrors"? What of the vampire bats, tarantulas, scorpions, leeches and army ants? Like the snakes, they're real enough, but they're much less fearsome than the Sunday supplement explorers would have you believe. One scientist deliberately exposed himself to the attack of vampire bats and was so little disturbed or frightened that he had considerable difficulty staying awake long enough to observe the results. It is true that their bite is painless, and that they can draw a small amount of your blood while you sleep. For that reason, if there are bats around use screens if you have them. But the bats won't leave you a bloodless corpse. The worst they may do is act as sleeping sickness carriers and this is rare.

Old wives' tales have it that the "tarantula" found sometimes on bananas from the tropics is capable of a bite that results in quick and certain death. Very large spiders, averaging two to three inches in diameter, are found in burrows in the ground, but they quickly retreat into their hideouts when you approach. Centipedes, scorpions, tarantulas and spiders may bite you. Generally, the worst you can experience is severe pain and some swelling, which will disappear in a few hours. The bite of certain large spiders in Australia may prove fatal but the spiders of America and Africa with one exception are not dangerous to a normal individual. The one exception is the notorious "black widow," a rather small and harmless-looking black spider with a red hour-glass figure on her underside. This spider has caused a few deaths, and, believe it or not, in the very healthy climate of California rather than in the "dangerous" tropics. You can take some simple precautions against spiders and tarantulas that should protect you. Before you lie down at night, look over your bedding carefully. Before you put your shoes on, shake them out; they're a favorite resting place for scorpions.

Leeches are common in the tropics in wet or swampy places and are often a nuisance. Their bite is harmless but the small wound they make may become infected and cause a sore. It is well to wear leggings or to tie the trouser legs snugly to protect yourself in areas where leeches are present. If a leech does attach itself to your skin, it is easy to remove. Don't tear it off, because the head may remain imbedded in your skin. Flick the leech off with a knife or if you have salt available, apply a pinch to the pest. A touch of a lighted cigarette or a swash of alcohol also will make it let go. Disinfect the site of the wound. When you have a companion handy, it's a good idea to strip daily to examine each other for the presence of leeches or ticks. Get them off before they have a chance to imbed themselves.

Army ants move about the jungle in long columns hunting for insects and other food. They are swarming killers who can devour anything *small* in their way that will not resist strongly. Unless you are helpless, absolutely the worst that can happen to you is a few stinging nips. If you get out of their way the army ants won't trail you through the brush like a pack of hunting dogs. And don't worry about being set upon and devoured in your sleep; you will be wide awake at the first bite and have plenty of time to move away.

Poisonous plants of the contact variety do exist in the jungle but none of them is as common or as virulent, as the abundant poison ivy and poison oak found in the United States. At the worst, you'll get a painful rash. You may happen on thornbushes and nettles, but once you get scratched you'll learn to recognize and avoid the offending growth. Watch the scratches. Disinfect them immediately if practicable. A secondary infection in the tropics is likely to be more serious than one at home. Learn the technique of moving about in jungle growth. A slow, deliberate, snake-like movement is best. Blundering forward only leads to bangs on the head and thorn scratches under the chin. You'll go faster if you watch your step. Keep your head forward with your chin in. Part the jungle; don't try to push through it.

Use common sense in the jungle and leave those horror stories back home in the zoo.

Your first night in the open or in a tent in the jungle may give you the "heebie-jeebies." The forest is alive with sound, with all manner of howls, shrieks, screams and eerie echoings. There some birds rattle out a machine-gun tattoo on tree trunks. The magnificent peacock makes a horrible noise. Monkeys may howl or roar like lions. Dead trees may fall and snap like pistol shots. Don't get the idea you're going to be jumped and mauled. Animals looking for food don't advertise. The loudest and most terrifying noises are made by harmless birds and monkeys. A cat fight on your back fence at home doesn't scare you. Get used to jungle sounds at night; they have about the same significance.

Now what about tropical diseases? The average fighting man imagines himself coming back from the tropics shivering with fevers, rotting with parasites and suffering from the ravages of dysentery and cholera. The truth is that a man can stay reasonably healthy in the tropics provided he observes a few simple precautions.

In many jungle and tropic areas, mosquitoes are thick and malaria is a serious problem, although the scourge is by no means universal. If you find yourself in a mosquito area, sleep under your net and take quinine or atabrine at the direction of your medical officer. Be especially cautious at night when mosquitoes are at their biting worst. Keep your face and head covered and if you have them, wear mosquito boots and gloves. Don't scratch mosquito bites. Malaria may be an uncomfortable ailment but with modern treatment and medicines, there's not much to fear from it.

Dysentery and cholera are intestinal diseases which you put into your own mouth. If you're careful about sanitation and the cleanliness of the food and water you consume, chances are you won't get them. Unless you are lost and starving, eat only food coming from cans or freshly cooked in your own mess, or fruit (thick-skinned) that you have peeled yourself. Watch the water you drink. Mountain streams distant from human habitation are safe. However, unless you know that there isn't a native hut a mile or two upstream, always boil the water you drink or sterilize it with chemicals.

News on tropical climate frequently has been distorted. The weather is warmer as a whole on a yearly basis than in the temperate zone to which you're accustomed, but actually the temperatures are not excessively high. The heat is simply more persistent and continuous, and in humid areas it may be somewhat uncomfortable. Yet, seasoned jungle travellers tell us that they have found Washington, D. C., in the summer much more oppressive than any jungle they've ever visited. Chilly nights are not uncommon in the tropics.

Now a word about the native "terrors." Cannibals and headhunters are a thing of the past. You may find natives hostile to small parties in the interior of Dutch New Guinea and in the Admiralty Islands. But for the most part, primitive jungle tribes have come under the influence of missionaries practically everywhere. The best evidence is represented by the invaluable assistance given our flyers who have been forced down in jungle areas. Most natives know they will be rewarded for the aid they render. Just remember to respect native customs; try to conform to their manners, or at least be tolerant of them. Let their women alone. It's a good idea to find out something about the natives in the area in which you will operate. A little understanding of their habits and language may help save your life some day.

While the tropical jungle will be very different from your home environment, the same principles of precaution apply. You soon learn how to live in the tropics but it's best to go there with foreknowledge. Take all the "terror" stories you've heard with a grain of salt. Knowledge and common sense will see you through. ☆

(Additional reading on this subject: "Jungle and Desert Emergencies," distributed by the Flight Control Command.—Ed.)

HE'S REALLY QUITE A MAN!

(Continued from Page 9)

northern Canada and he was there with his passengers for 39 days before the weather permitted rescue crews to get them out. For a month this pilot, his crew and his passengers had been supplied with food supplies by parachute. Equipment was dropped which permitted them to cut out a runway on the ice of the frozen lake. After their rescue, crews went in and flew the forced down C-87 off the ice.

Both the pilot and plane are still in the North Atlantic service, each of them graphic examples of the closely meshed coordination between the civilian and military personnel of the Air Transport Command.

If you've ever flown one of the commercial luxury airliners you'll remember up above the instrument panel where they had the cigarette lighter, just like the one on the dashboard of your car. Down over the South Atlantic recently one of these old airline pilots absent-mindedly reached up above his head for the lighter. Before he could drop the cigarette from his mouth the right motor conked out on him. He had forgotten that on ships being delivered to the Army such luxury items as cigarette lighters are non-essential. Where the lighter used to be is the control for feathering the props.

Little incidents like that keep them on their toes.

They have no guns on their planes even though they are often flying through skies patrolled by enemy planes.

"Yeah, we think about it some," one veteran million-miler told me. "Hell, we even got it planned to stick broom handles out through the cargo doors to make 'em think we got machine guns if we ever get jumped. Maybe it'll scare 'em off."

As a matter of fact the only armament they carry is a forty-five for their life raft and a Very signal pistol. Not much use against cannons or lead-spitting fifties. But the Air Transport Command will tell you that their job is to deliver the goods and armament weight reduces precious pay load.

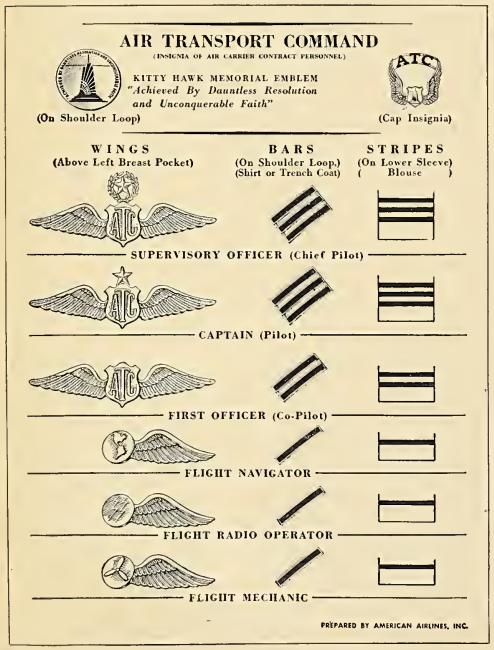
Sometimes their cargo is as dangerous as enemy planes in the sky. One pilot tells the story of carrying a load of 6,000 pounds of short fuse detonators, which is just about as dangerous as coming home to your bride of three weeks and telling her you dropped the family bankroll in a friendly game of poker.

"We showed up at this base," he says, "and the dispatcher tells me there are three Generals waiting to hitch a ride on to the next stop. 'You aren't afraid to fly so much brass in one load, are you?' he asked me.

" 'I think a hell of a lot more of my own skin than that of any General and I'm riding with it,' was my answer."

However, the Generals failed to arrive in time for the scheduled departure so an Army chaplain, evidently having already made his peace upstairs, climbed in for the ride and slept peacefully the whole trip atop the detonators.

Overseas, however, isn't the only place you will have a chance to become acquainted with the new ATC uniform. They are approved for airline personnel in the vast transition transport training program and domestic cargo operation of the Air Transport Command. At Army Training Detachment fields these airline veterans are conducting the training program under the Army-approved curriculum prepared by the Airlines War Training Institute. On the regular cargo runs each veteran pilot will have two Army Air Forces trainees under his guidance, teaching them the important "know how" of transport flying. The gray matter and experience in transport technique tucked in between the ears of these air contract carrier personnel and now being conveyed to Army trainees is one of the most important contributions of this country's airlines to the war effort.



The importance of this domestic air cargo operation cannot be over-emphasized.

It is a system that permits air cargo planes to operate schedules between the factories turning out vital parts and the modification centers, training units and air depots.

Frequently a plane is finished at the factory needing only one small part before it is operational. The part may be produced in a plant that is across the country. If parts of this kind can be picked up today by plane, delivered to the manufacturer and installed on the waiting plane, it may be flown to its destination with a minimum of delay. It may save five days in the time required to get an airplane into action. Adding these savings together often totals a month. A month saved getting a plane into combat may mean the difference between victory or defeat.

These pilots work hard, averaging 100 hours a month in flying, making daily trips of eight to twelve hours duration. On a round trip from a base in the United States and return they'll maybe be gone from a week to ten days, putting in a total of 35 or 40 hours of actual flying time in that period and covering up to 12,000 miles.

Submarines are a big worry to them, not only because of the danger U-boats represent but because it makes their blood boil when a German sub crew down in the South Atlantic mans the guns on the deck and waves for them to come on in and fight.

"And us without even a brick to drop on them," they moan.

But submarine scares furnish many a laugh, too, on cold icy nights at lonely bases across the North Atlantic route, as they sit around waiting for the weather to clear. They tell and retell the story of the crew flying a C-87 up an Arctic fjord last winter, under a heavy overcast, when they spotted what they thought to be two submarines firing tracers from their bow deck guns. They got out of there in a hurry only to find out later that their "submarines firing tracers" were a couple of whales spouting water.

They've had German aircraft chase them in the skies off England and icy runways crack them up in the Arctic. They have sweated in temperatures as high as 105 degrees and a few hours later been in the midst of a raging blizzard.

"Why we don't all die of pneumonia, I'll never know," more than one marvels.

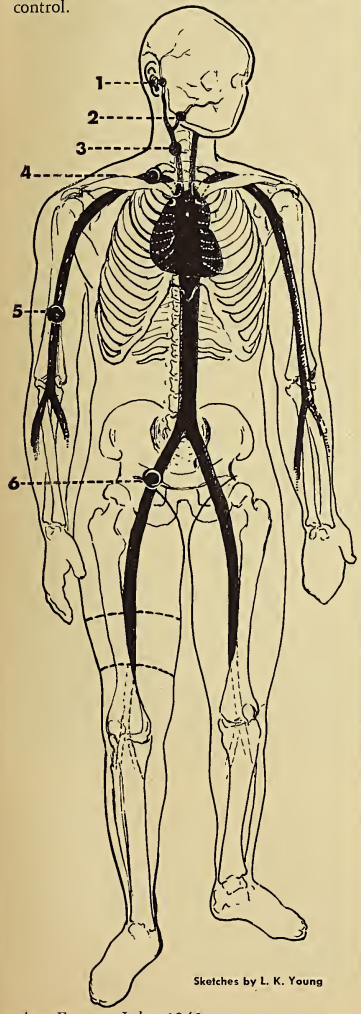
So the next time you see an Air Carrier Contract man wearing the "ATC" insignia look at him with respect. Maybe he's forgotten more about flying than you'll ever know. And remember that fighting a war isn't all ribbons and fast pursuits and sorties with tons of bombs over the enemy. Remember that it takes supplies and men and vital materials to carry out these missions and they are needed in a hurry. It is the Air Transport Command's job to see that they are delivered there when they are needed. And this man is doing his part to see that they arrive on schedule.

He's really quite a man! ☆

SAVING LIVES WITH YOUR FINGERTIPS

In this and other wars, untold hundreds of lives have been lost due to excessive and uncontrolled flow of blood from wounds received in battle. Bombers have returned from missions with bodies of crew members who bled to death. In many cases, the simple knowledge of first aid pressure points on the part of a companion might well have saved a life.

The accompanying diagrams illustrate these pressure points for the control of hemorrhage. On the full figure are pointed out the locations of these vital arteries, while the close-ups show the proper placing of the fingertips to accomplish pressure control.



Sketches by L. K. Young

1. To control bleeding in the scalp above the ear, *light* pressure is applied in front of the middle of the ear, where the temporal artery can be felt pulsating.

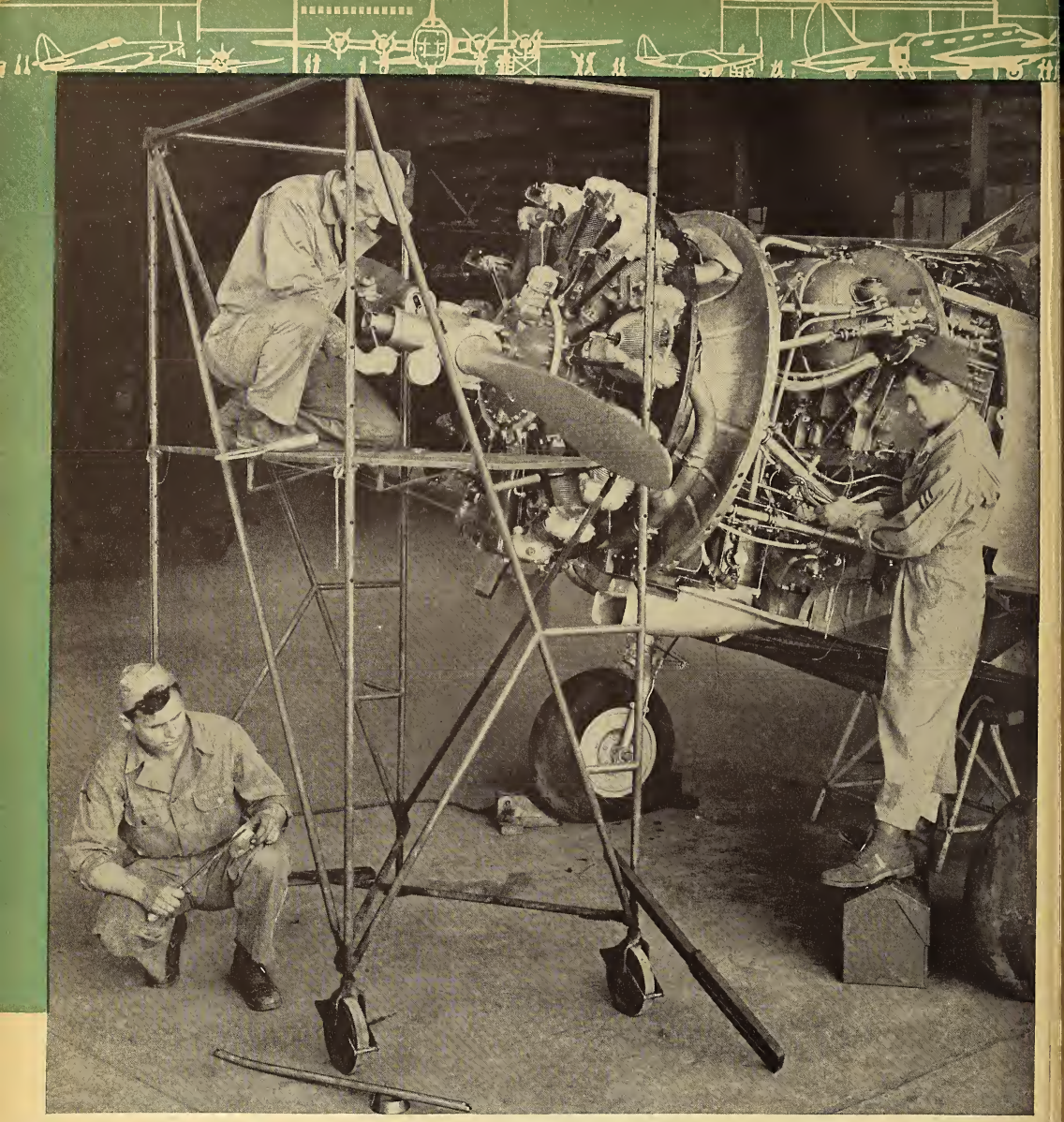
4. Located behind the middle of the collar bone is the subclovian artery. When this artery is *firmly* pressed against the first rib bleeding in the arm can be controlled.

2. In a notch on the under edge of the jaw, two-thirds of the way back from the tip of the chin may be found the small facial artery. *Very light* pressure here will control bleeding in the cheek.

5. At this point the large artery of the arm (brachial artery) can be compressed against the long bone of the arm. When *strong* pressure is exerted here the pulse at the wrist will disappear. It is at this point also that one may apply a tourniquet for control of hemorrhage in the forearm below the elbow.

3. About a hand's breadth below the ear and about halfway between the jaw and the collar bone, the carotid artery can be felt throbbing in the neck. Moderate pressure of this artery against the spinal column controls bleeding above that point on the same side of the body, both on the inside and on the outside of the head.

6. *Strong* pressure in the groin with the heel of the hand presses the femoral artery against the pelvic bone and stops or decreases bleeding in the thigh and leg.



WHAT'S WRONG WITH THIS PICTURE?

Daisies won't tell—but T.O.s will.

This page will give you some laughs but it isn't meant to be merely humorous. The real idea is to depict some everyday maintenance boners. Some of the mistakes that look funny in the picture aren't quite so laughable when they happen in the hangar. You'll find those mistakes listed on Page 32. Technical Sergeant John R. Hicks, crew chief in the photograph, can point out eleven errors. Did he miss any? How about it, mechs?

The picture this month for our regular feature "ON THE LINE" was posed by Technical Sergeant Hicks, on the stand; Private First Class Leonard Gallas, left, and Sergeant Gene Wefler, all stationed with the 18th Headquarters Squadron, Air Service Command, Patterson Field, Ohio.

ON THE LINE

A monthly maintenance roundup prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

Did You Know . . .

That salt tablets and water for mechanics are plentifully supplied in all hangars and shops? Don't wait until the heat gets you. Take these salt tablets and drink plenty of water to replace the salt and water your body loses in excessive perspiration.

Radial engines do not require water, but a human engine does. Service your own cooling system regularly. Camels can drink ten or twelve gallons of water at a time, store up a water supply. Human beings can't. Their water intake must be at frequent intervals to avoid dehydration. There's your cue.

Ventilation is important in combatting the ill effects of heat. Look around and see that windows and doors are kept open. Get all possible circulation of air when temperatures are torrid.

Take salt tablets before you need them, not when it's too late.

Cool off a little before gulping cold liquids. Keep windows and doors open for best ventilation possible.

Such simple heat precautions may prevent your incapacitation. Stay off the sick list for your own comfort, and to fill the vital need for your work.

Strange As It Seems

At a midwestern field, eight airplanes were found to have either one or two wheel retaining nuts safetied with common nails. Cotter pins should be used, as indicated in T.O.'s -03-25 series.

Twisted Cables . . .

Rudder trim tab cables, particularly on single-engine trainers, occasionally get twisted inside the rudder during installation. This condition is often overlooked during subsequent inspections. These twists will break the strands, thus weakening trim tab cables, and endanger steering apparatus. Watch for this at the next inspection. Take a look at T.O. 01-1-26.

Importance of Crating . . .

Sloppy crating of Army Air Forces equipment for shipping will inevitably result in damage en route. Frequent example of carelessness: improper or inadequate crating. Crates should be made plenty strong, as prescribed in T.O. 01-1-31.

Engines, in particular, have not been given sufficient care in crating. For the right way to do it, see T.O. 02-1-1, paragraph 4. Bust our stuff over Tojo's head, not in some railroad boxcar.

Cotter Pin . . .

Keep the old eye on each cotter pin installed in landing wheel retaining nuts. If the pin is not bent and cut off as directed, the end will rub against the dust cap. This will cut off filings, which work their way into the bearings and inflict damage there.

See T.O.'s of 03-25 series. These pertain to landing gear.

Deflating Struts . . .

Damage to a valve core causes air leak and possible disaster to the airplane while landing with a deflated strut. This trouble is often traced to air-oil shock absorber struts being deflated by depressing the valve core. T.O. 03-25E-1 specifies that the strut is to be deflated by backing off filler plug slightly. Lightly and politely, mechs.

Engine Hoists . . .

Remember that the type A-2 engine hoist assembly must *not* be used without the crossbar attached. Minus the crossbar, the legs might spread, dropping the engine to the floor. Think of what this does to the engine, or you, if you're underneath when it falls.

Here Comes The Sandman . . .

Sand and other impurities often are found in gas strainers. T.O. 06-1-1 gives instructions for cleaning gas servicing nozzle screens. If not cleaned regularly, dirt gets into the aircraft fueling system. A sorry situation if that dirt stops the engine while in flight.

Carburetor Air Cleaners . . .

Many an airplane engine's life has been cut short in early youth because carburetor air cleaners were not cleaned and oiled daily. This daily requirement is set forth in T.O. 01-1-23. Our engines must live to a healthy, ripe old age.

IS THIS NEWS TO YOU?

That there is now a standard system covering the use of hand signals to guide the operation and movement of all aircraft on the ground? Every mech should learn and use the signals officially adopted by the AAF to direct taxiing airplanes. It's the real way to insure a high degree of safety.

Illustrated on this page are the five signals needed most frequently. The drawings give the correct signals. Refer to Schedule A of AAF Regulation 62-10 which gives the *complete* setup on the new standard hand signals.

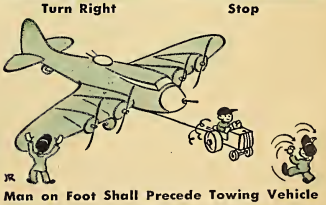
Go Forward
(Stand where pilot can see you)

Parking Completed

Turn Left

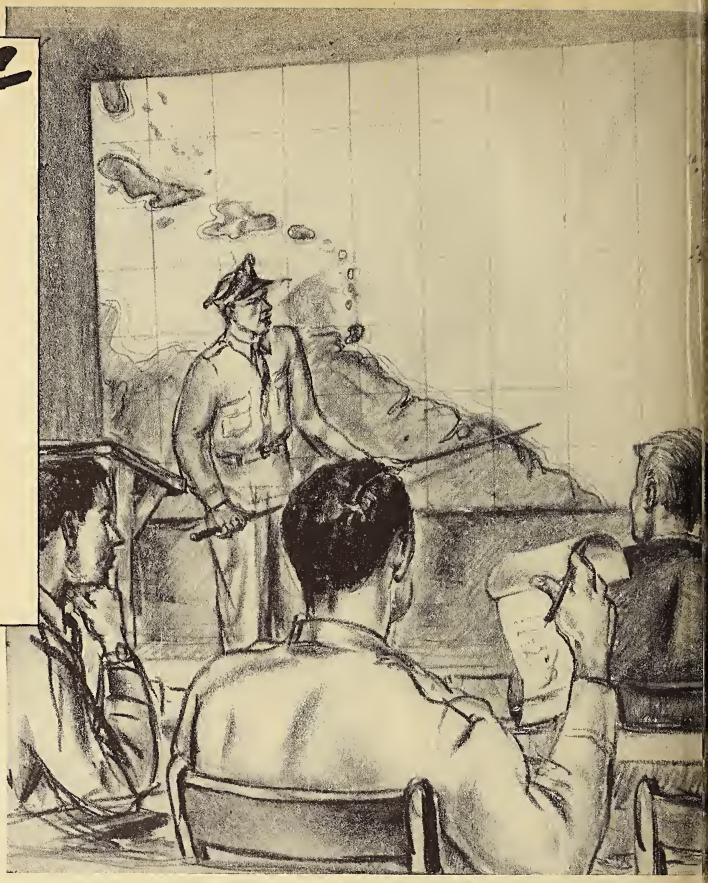
Turn Right

Stop



Man on Foot Shall Precede Towing Vehicle

BRIEFING For the South Atlantic Run



By CAPTAIN T. W. FINNIE

GROUP S-2, MORRISON FIELD

COMBAT crews headed for the battle-fronts by way of the South Atlantic route are processed through Morrison Field, Florida.

This station is responsible for seeing that all departing planes are properly equipped and prepared for the flight overseas and, moreover, that they are manned by crews provided with adequate training and information. Officers and men of such crews go through our S-1, S-2, S-3 and S-4 sections for the final check-up.

Not the least of these responsibilities is that of the briefing unit. It is the duty of the briefing unit:

1. To insure that all crew personnel are properly equipped for the flight, including the issuing of route data, maps, navigational equipment, secret codes and other necessary material.
2. To insure that all flight personnel of departing aircraft are familiar with the facilities and conditions of the route.

It is upon information supplied by this section that a crew largely depends in meeting its initial challenge—to get over that water.

Briefing for trans-oceanic flights, as now practiced in the Army Air Forces, really began at Morrison Field.

More than a year ago the field was established as an Air Transport Command base and since that time a vast store of flight information has been collected. So extensive is this data that, if necessary, a crew could probably be briefed for a trip not merely across the South Atlantic but to any part of the eastern world.

Route information concerning weather, radio beacons, location and procedure of airfields, and other conditions affecting flight is maintained in complete and compact form. This data is kept up to date and expanded by reports from returning pilots. The briefing section has a wide variety of United States, British and French aeronautical, engineering and hydrographic charts. A map and chart room, perhaps the most extensive library on the South Atlantic route, has shelf after shelf of both the long range and pilotage type maps. Some are special maps and projections developed by navigators sent out from the station itself on trail-blazing missions.

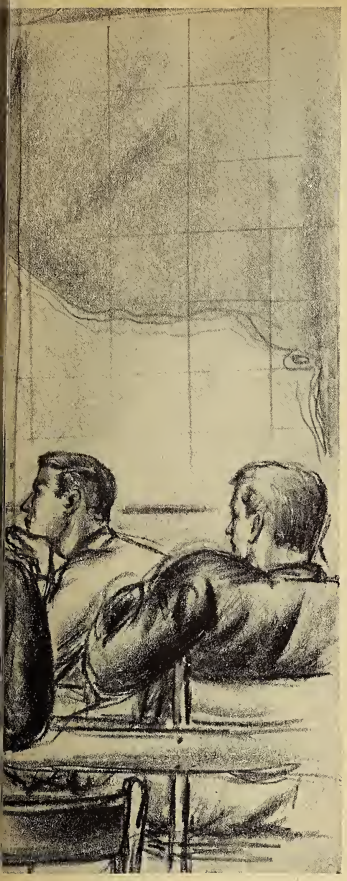
ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

Supplementing all this information are photo displays with pictures of main and auxiliary fields, runways, living quarters, repair and overhaul facilities, and the like.

IN a word, briefing at Morrison is comprehensive, visual, and up-to-the-minute designed to give a pilot a rounded picture of any area to which he may be going.

The actual briefing of pilots and navigator of a combat crew takes very little time—approximately 45 minutes. This time, of course, varies with the experience of the crews being briefed. Those familiar with the South Atlantic flight can be briefed in fifteen minutes, receiving only changes and late information since the crew's last trip.

When a crew first arrives at Morrison Field it reports to group operations for processing. Briefing is scheduled for three definite periods each day, but it is actually available day or night, at the request of a plane commander or flight commander.



Combat crews are well prepared for their first big over-water flight

Briefing appointments are made at least 24 hours before take-off. Last minute instruction is not satisfactory because it adds to the mental confusion of a crew necessarily engrossed with other details of departure. The purposes of advance briefing are:

1. To discuss with pilot and crew the route folder, which has its maximum value when studied at leisure.
2. To give pilot, co-pilot and navigator an opportunity to read the latest information about the route, and to examine reports of returning crews.
3. To allow time for pilot and crew to question experienced personnel at the station, on matters pertaining to oceanic flying.
4. To allow the navigator enough time to calibrate his instruments and prepare his maps.
5. To allow time for study of photographs and all related data except weather information which, of course, is imparted just before take-off.

Briefing takes place in a large room which has a relief map of the Caribbean Area, fifteen by eighteen feet, to illustrate verbal information.

Normal briefing includes a discussion of visual signs for identification purposes, communication identification codes, Rekoh cards, and an explanation of the weather folder which the pilot receives from the weather officer.

Explanation of the pilot's folder comes next. This is prepared by the briefing office and contains the latest route information obtainable from all accurate sources. Crew members always have an opportunity to read over this folder before a briefing and are ready to ask pertinent questions.

The folders are arranged very logically. Like the data used by commercial airlines, the regular route and regular stops are separated from the alternate route and alternate stops or emergency fields. This technique permits the pilot to have a small, compact folder for the regular route he anticipates flying.

For use in an emergency, the pilot will still have additional information about the nearest alternate airport and a route to it.

Since it is obvious that the value of the information furnished by pilots passing through Morrison Field is the speed with which it is made available to other crews, a new directive permits the use of certain data in these pilots' folders without waiting clearance from Headquarters in Washington.

Folders are arranged geographically so they can be followed progressively along the route to be flown.

They include descriptions of fields, radio stations and frequencies, of housing and messing facilities, and of prominent geographical landmarks which can aid in navigation. All this material is illustrated by photos. The weather folder, given immediately before departure, contains a weather map of the pertinent area, a cross-section diagram of conditions forecast over the route, a flight plan, and the weather codes.

During the briefing, the briefing officer discusses individual airports and the procedure for entry through corridors to avoid restricted areas. Radio facilities along the route are thoroughly analyzed for their navigation value. Crew personnel are invited to ask questions relative to any of this information.

The general climatic conditions to be expected are discussed by officers who have covered the route, and suggestions are made concerning elevations, let-down procedures, and methods of avoiding turbulence and storms. The crew receives a detailed weather briefing one hour before departure.

Briefing covers the Caribbean Area and the South Atlantic as far as the first stop in the South Atlantic Wing. This is done for several reasons, principally because the first long flight to South America is frequently a "shakedown flight."

New crews are inclined to be worried about the long over-water hop. Confidence can be inspired by a complete discussion of the entire route within the Wing by officers personally familiar with it. Each station within the Wing supplements the overall briefing with a detailed briefing of the next leg of the flight anticipated by the crew.

A new crew, therefore, receives at Morrison a highly specific briefing on the first leg, a specific written instruction for the entire trip, and a verbal treatment of the overall route within the Wing.

No night flights are permitted without a navigator. After the briefing, the navigator of a crew is taken aside by an experienced navigator who explains in great detail the problems of long-range aerial navigation of the South Atlantic. Each navigator must satisfy the briefing navigator that he is properly equipped and capable of making the flight. All essential equipment for his work is available at the field. He has, moreover, a locker to store his equipment and broad desks upon which to facilitate the handling of his maps and charts.

Radio operators are likewise given special attention after the main briefing. They are briefed in detail by radio operators who are well experienced in communications and procedure along the route.

To all members of the crew much stress is laid upon the necessity for maintaining military security. The briefing officer discusses the possibilities and procedures in case of capture, escape and parole in enemy territory, and the destruction of classified material. Instructions concerning IFF and VHF equipment and its destruction is included.

Emphasis is placed on the current position of enemy and friendly troops and air forces, so that the crewmen will be oriented when they set out.

Maps extending as far as Cairo and the Middle East are provided at Morrison. These maps cover all four of the methods of navigation—pilotage, dead reckoning, celestial and radio. It has been found that all four methods may have to be utilized.

With folders, reports from returning crews, photographs and various other kinds of data, every member of a crew has a mass of material on hand at Morrison with which to inform himself for the South Atlantic flight. This written information is supplemented by personal advice from briefing officers, who are always available.

It is not expected that either a pilot or a navigator will memorize all the details of what he has been told, for they are voluminous. But every effort and facility is provided to help him know his business thoroughly. The procedures, material and methods used in briefing at Morrison Field have been the result of much experience. When a crew leaves the field it should not only know how to get where it's going—it should be ready in every way for foreign duty. ☆

A monthly record of decorations awarded to personnel of the Army Air Forces.

Capt. E. H. Nigro

Lt. A. W. Lowry

Lt. R. L. Hartzell

Capt. R. T. Schumache

DISTINGUISHED SERVICE CROSS

BRIGADIER GENERAL: Howard K. Ramey (Also Distinguished Service Medal). **CAPTAIN:** David A. Campbell. **LIEUTENANT COLONEL:** George B. Greene, Jr. **LIEUTENANT:** Edward D. Durand.

DISTINGUISHED SERVICE MEDAL

MAJOR: Lewin Bennett Barringer.

SILVER STAR

COLONELS: William W. Momyer (With Oak Leaf Cluster, Also Distinguished Flying Cross and Air Medal with three Oak Leaf Clusters), Edward Timberlake, James H. Wallace, Stanley T. Wray. **LIEUTENANT COLONELS:** Charles E. Mario, Claude E. Putnam, Jr. **MAJORS:** Raymond S. Morse, Walter B. Putnam, Henry N. Sachs, Allan J. Sewart, Jr.* (Also Distinguished Flying Cross* and Air Medal*). **CAPTAINS:** Glenn W. Clark, Edwin A. Loberg (With Oak Leaf Cluster, Also Distinguished Flying Cross), Raymond P. Salzarulo*, Roman T. Schumacher, Leo F. Wolcott, Jr., Boris M. Zubko. **LIEUTENANTS:** George F. Callahan, Jack I. B. Donaldson (With Oak Leaf Cluster), Bruce A. Gibson, Jr., Rush V. Greenslade, Thomas L. Hayes, Jr., Kermit C. Hynds, John W. Kidd, Edward J. Magee, Mortie M. Marks, Ralph G. Martin, Kermit E. Meyers, Richard E. Miller* (Also Purple Heart*), James B. Morehead, Marne Noelke, Glenn C. Osbourne, George A. Parker, John C. Price, Gustave R. Rau, Robert H. Richards, Daniel T. Roberts, Charles E. Rogers, Mabry Simmons, Luther P. Smith, Jr., Lloyd H. Stinson, Charles P. Sullivan, Joe Walker, Dugan V. Woodring. **MASTER SERGEANT:** Franz Moeller*. **TECHNICAL SERGEANT:** Clarence E. Daugherty, Thaddeus S. May, Claude B. Phillips, Cal Russell, Robert Starevich (Also Distinguished Flying Cross and Air Medal), James H. Turk. **STAFF SERGEANT:** Richard T. Brown, Harold J. Leamster, Hubert M. Stratton, D. C. Stuart, Arthur Webber, Leslie D. Willard (Also Distinguished Flying Cross). **SERGEANTS:** Ronald J. Allsop, Karl E. Binder (Also Distinguished Flying Cross and Air Medal), Joe G. Maupin, Charles Petrakos, Leo T. Ranta, George D. Scheid*, Aaron B. Shank*, Thomas W. Smith, John J. Stephenson. **CORPORALS:** William R. Holmes, John W. Kinnane, Hyman Marder, Leo E. Shreve (Also Purple Heart), Robert P. Swan (Also Purple Heart), William J. Wagner*, Charles H. Young.

* Posthumous

PURPLE HEART

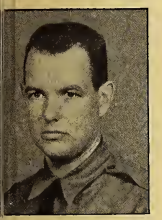
COLONELS: Harry G. Montgomery, Wilfred J. Paul, Augustine F. Shea. **MAJORS:** Victor C. Huffsmith, Carey L. O'Bryan (Also Air Medal), Marvin E. Walseth. **CAPTAINS:** Gilbert E. Erb (Also Distinguished Flying Cross with Oak Leaf Cluster and Air Medal), Howard R. Fellenz, Andrew J. Reynolds, Donald R. Strother* (Also Air Medal*). **LIEUTENANTS:** Barnett S. Allen, Garde B. Baldwin, Edwin M. Boughton (Also Air Medal with three Oak Leaf Clusters), Everett L. Clinard, David M. Conley, Herbert V. Dow, Robert Paul Dresp, James H. Foster, Delbert H. Hall, Edwin P. Heald, Cleveland D. Hickman, John T. Hylton, Jr., Oscar R. Krebs, Allan W. Lowry, Clarence E. McClaran, Mac M. McMarrell, William R. Maloney, Robert H. Markley*, Louis G. Moslener, Romulus A. Picciotti, Harvey E. Rehrer, Jacob C. Shively, Frederic E. Whitaker. **MASTER SERGEANT:** Warren B. Caywood. **TECHNICAL SERGEANTS:** Anthony L. Buckley, Edward J. Cashman*, Harry D. Donahey, Lloyd C. Martin, Clarence A. Witmer. **STAFF SERGEANTS:** Rupert W. Arnold, William A. Bellwood, Edwin A. Bettencourt, George P. Bolan, Maurice P. Cotter, Edward C. Graboski, Elwood R. Gummerson, Wilson A. S. Howes, Maurice W. Knutson, Harold F. Lightbown (Also Distinguished Flying Cross with Oak Leaf Cluster and

ROLL OF HONOR

Capt. A. J. Kush

Lt. R. H. Dennis

Sgt. Alfred A. Ise

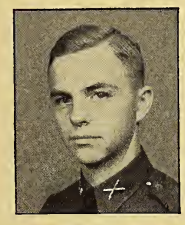


Capt. G. W. Clark

Lt. A. E. Aenchbacker

Capt. Denver Truelove

Lt. R. P. Dresp



Capt. C. H. Hillhouse

Lt. Col. L. I. Davis

Major W. B. Putnam

Col. J. H. Wallace

Sgt. H. F. Lightbown

Air Medal), Sheldon D. Nearing, Everett F. Perkins (Also Oak Leaf Cluster to Silver Star), Andrew Seman, Paul J. Smith, Earl E. Teats, Charles D. Wright. **SERGEANTS:** Wilbert R. Burns, Francis D. Crossman, Samuel H. DeBerry, Robert C. Dewey, William Hislop*, Edmund B. Lepper*, George M. Martin, Jr.*, Edwin N. Mitchell*, Robert J. Nichols, Richard K. Ramm, Roslyn C. Richardson. **TECHNICIAN FOURTH GRADE:** James L. Schiller. **CORPORALS:** Edward Finn, Roberto Gonzales, Emmett E. Morris*, Hoyt A. Pollard, Antonio S. Tafoya*, James M. Topalian*. **TECHNICIAN FIFTH GRADE:** Martin J. Zimmermann. **PRIVATES FIRST CLASS:** Louis H. Dasenbrock*, James E. Gossard, Jr.*, William E. Hasenfuss, Jr.*, Carl E. Lanam, William E. McAbee*, Harrell K. Mattox*, Alfred Osborn, Sidney E. Wroton. **PRIVATES:** Garland C. Anderson*, William F. Blakley, Robert S. Brown*, Willard Fairchild, Russell E. Gallagher*, Robert R. Garrett*, Glenn V. Greenfield, John J. Horan, Walter J. Hughes, James R. Johnson, Robert H. Johnson*, Donald Y. Kemmerer, Marion E. King, Jr.*, Herbert E. McLaughlin*, Charles Mesrobian, Victor L. Meyers*, George A. Moran*, Robert S. Waugh, Theodore A. Wenzel.

DISTINGUISHED FLYING CROSS

BRIGADIER GENERAL: William E. Lynd (Also Air Medal). **COLONELS:** Thomas O. Hardin, Ernest K. Warburton. **MAJORS:** John A. Roberts, Jr., Raymond F. Rudell, Francis A. Smith. **CAPTAINS:** Charles H. Bowman, Vincent M. Crane (Also Air Medal), Charles H. Hillhouse (With Oak Leaf Cluster), Clyde B. Kelsay (With Oak Leaf Cluster), Ira F. Wintermute. **LIEUTENANTS:** George W. Beaver, John E. Bloomhuff, Robert E. Carlson, Charles M. Carter, Leo M. Eminger, David C. Everitt, Jr., Richard H. Dennis, Dan D. Drakulich, Rush E. McDonald, Clarence L. Marthey, William R. Morhous, Richard W. Nellis*, Jack Pebworth, Arthur J. Platt, R. V. Prouty, Michael L. Reitman, Francis L. Schneiders, John W. Sears, Robert L. Stevens, James C. Watson, Frederick G. Wheeler (Also Air Medal with Oak Leaf Cluster), John L. Wolford. **FLIGHT OFFICER:** Burl S. Ashley (Also Air Medal). **MASTER SERGEANT:** Russell E. Mackey. **TECHNICAL SERGEANT:** Louis Burleson (With Oak Leaf Cluster). **STAFF SERGEANTS:** Ralph W. Barnes, J. W. Childers, David C. Culver, Lawrence E. Donald, John J. Gerrity, James E. Houchins*, James M. Iverson*, P. J. Leonard, Joseph W. McWilliams, John R. Meeks, Jr., Peter F. Novak, Robert K. Stone, Jr., John F. Szymonik, Thomas G. Thompson, David C. Vaughter, Wilbur H. Weedin. **SERGEANTS:** Joseph J. Brust, Victor A. Edwards, Charles D. Hudson, Wayne E. Johnson, Donald J. Kundinger, Doyt T. Larimore, Howard S. Peterson (With Oak Leaf Cluster), Walter E. Shay. **CORPORALS:** Bruce W. Osborne, Robert G. Thomas, Alexander Zaretsky. **PRIVATES FIRST CLASS:** George R. Graf, Edwin Rhodes. **PRIVATES:** Francis J. Foye, Paul Panosian. *(Continued on Page 32)*

Air Forces ROLL

A monthly record of decorations awarded to personnel of the Army Air Forces.

DISTINGUISHED SERVICE CROSS

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* Posthumous


Capt. E. H. Nigro


Capt. A. J. Kush


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Lt. A. W. Lowry


Capt. G. W. Clark


Lt. A. E. Aenchbacker


Lt. R. L. Hartzell


Lt. R. P. Dresp


Capt. C. H. Hillhouse


Capt. R. T. Schumacher


Major W. B. Putnam


Col. J. H. Wallace

OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

MAJOR: John Dougherty. **LIEUTENANT:** Curtis J. Holdridge. **TECHNICAL SERGEANTS:** Stanley C. Jackola, Fred S. Secrest. **STAFF SERGEANT:** Douglas H. Logan, Lloyd D. Whipp. **SERGEANT:** John J. Wilfley.

SOLDIER'S MEDAL

TECHNICAL SERGEANT: Lee R. Embree. **STAFF SERGEANT:** Moses B. Tate. **SERGEANTS:** Norman L. Johnson, George J. Manger, Edward L. Schmidt. **CORPORALS:** Joseph H. Hanejcek, Luther O'Neal. **PRIVATE FIRST CLASS:** Leon A. Thomas.

AIR MEDAL

MAJOR GENERAL: Hubert R. Harmon. **COLONELS:** William C. Bentley, John K. Gerheart, Arthur W. Gross, Benjamin S. Kelsey, A. J. Kerwin Malone, Elliott Roosevelt. **LIEUTENANT COLONELS:** William Basye, Elwin H. Eddy, Cass S. Hough, Herbert Morgan, Jr., Donald N. Wackitz. **MAJORS:** Owen G. Birtwistle, Adam K. Breckenridge, Richard G. Buswell, Bruce K. Holloway, Dwight F. Lewis, Stephen D. McElroy. **CAPTAINS:** Arthur Kush, Edward H. Nigro, Denver V. Truelove, Laurence R. Blackhurst, Jr., Joseph W. Boone, Donald E. Bradley, John J. B. Calderbank, Kenneth K. Wallick. **LIEUTENANTS:** Oscar Aarness, Robert L. Hartzell, Arthur Eugene Aenchbacker, Donald L. Arlen, Thomas F. Armstrong. **SERGEANTS:** Donald C. Appleman, Melvin C. Bahnmiller, Robert E. Browe, Henry A. Buller, Robert E. Collins, Keith F. Colpitts (With Oak Leaf Cluster), Raphael A. Cournoyer, David C. Dodd, Charles E. Donahoe, James T. Ellenburg, Roy Ellis, Earl D. Favinger, Welton K. Fulton, Daniel E. Gable, Archibaldo Gonzalez, Zackie T. Gowan, Jr., Herman S. Haag, Wilmer J. Harverson, James M. Henderson, Thomas E. Hight, Alton H. Hinson, Warren K. Hughes, Alfred A. Ise, Joseph W. Sanders, Randy Shelhorse, Jr., Edward D. Smith, Edward H. Smith, Sylvester Stanley, Jr., Francis G. Stein, Earl E. Stevens, Jr., John H. Stolting, John D. Sullivan, Burrel T. Thorne, Joseph R. Tokar, John E. Treon, Felix A. Trice, Dana R. Wemette, Hinson C. Witt, **CORPORALS:** Walter A. Bohnenstiehl, John J. Duffy, Edmund M. Fitzjarrell, Edward C. Lindquist (With Oak Leaf Cluster), Hubert E. McKinney, Frederick T. Mayer, Phillip J. Murphy, Stanley O. Niedwecki. **PRIVATES FIRST CLASS:** Lenwood E. Benham, John Q. Brock, Abraham Levin, Bernard P. Ritts, Ralph W. Thomas. **PRIVATES:** Theodore A. Alleckson, Harry F. Arnold, Frank D. Axtell, Johnie O. Burcham, Alfred M. Faries, Ellsworth L. Kidd, Fred J. Littlewolf, Roland C. Lorenz, William G. Merriman, Leward T. Opsal.

MISTAKES IN "ON THE LINE" PICTURE

on Page 26

(Beginning at lower left corner)

1. You an the left, buddy. That file laoks big enough to whittle a harseshae. It's pure fally to attempt ta dress thase threads that way. Return the cylinder head (fram the prapeller cantrol unit) to the machine shap for rethreading.

2. Hey, you an the stand, there's a taal lying an the edge af yaur maintenance stand. The slightest shift of yaur faat and . . . kank . . . it's on yaur friend's head.

3. Nix an tightening that retaining nut with a screwdriver. To get the praper leverage and tensian use the specified bar. Reference: T.O. 03-20A-1.

4. And laak what yau've dane. Believe it ar nat, it daes happen. The mech installed that prap by hoisting it right aff the maintenance stand, lacking the stand between the prap and the engine. Now the prop will have to be remaved ta get the stand free.

5. That maintenance stand must be aur jinx this month. Anather affense: It's rubbing against the spark plug terminals. T.O.'s give you essential infarmatian but yau're expected ta use common sense alang with it.

6. And, Sergeant, the wheel lacks haven't been tightened an the maintenance stand wheels. After all, it isn't a tea cart.

7. There's a rear cone on the flaar in frant af the stand. Could it be that the mech fargot ta install it? Reference: T.O. 03-20CB-2. Besides, what's that rear cane daing an the floar anyway? The surface af the rear cane is machined and palished and shauldn't be expased ta scratching or other passible damage. Never leave it carelessly on the floor or allow other surfaces ta nick its finish. (Incidentally, that bar resting an the rear cone is the tool that shauld be used ta tighten the retaining nut instead af a screwdriver.)

8. A tarque blade beam shauldn't be wedged in the ladder. It might mean a braken ankle shauld the crew chief make a quick descent.

9. Naw, yau, an the right. Thase water pump pliers are taa large far tightening hase clamps. Hase clamps shauld be finger-tightened. Reference: T.O. 03-1-20.

10. And what's going an here? Yau're standing an a taalbox. It's unsafe and, besides, it might injure the box.

11. Are chacks being ratianed? Or did the mechs just farget ta put one under the right wheel? If the plane maves, the maintenance stand will cause the prap ta lase her schaalgirl complexian. Reference: T.O. 01-60FC-2.

ANSWERS TO QUIZ

ON PAGE 8

1. (a) P-51.
2. (b) Prevent the spread of respiratory diseases.
3. (b) Gasoline.
4. (b) False. The command, right step, march is executed starting with the right foot.
5. (c) Calcium hypochlorite is inappropriate. It is a chemical used in water purification. Benzene and Carbon tetrachloride are cleaning fluids.
6. (c) Mister Jones.
7. (b) The wing loading.
8. (d) Parade rest.
9. (b) False.
10. (c) Hung on the recipient's neck, suspended on a ribbon.
11. (b) ½ inch below top of shoulder seam (see AAF Reg. 35-11).
12. (c) 110 feet.
13. (a) True.
14. (c) Wind direction indicator.
15. (c) A theodolite is used by meteorologists to follow the ascent of the gas filled balloon in checking wind velocity and direction.
16. (b) Captain
17. (b) Florida.
18. (b) Prevents a turret gunner from shooting into the tail, the propeller or the other surfaces of his own plane.
19. Mustang.
20. Hudson Bomber.

PICTURE CREDITS

7: Royal Air Force. 8: British Information Service. 9 and Back Cover: AIR FORCE Staff Photograph. 39: First Motion Picture Unit, AAF, Culver City, California. All other photos secured through official Army Air Forces sources.

FLIGHT TO NAPLES

(Continued from Page 7)

Clusters drop out horizontally and, a few feet below the plane, the six little bombs split away from each other and point their noses down toward the target in a long parabolic arc.

"Bombs Away! Bomb bay doors closed."

Suddenly two bursts of flak went off directly between us and the other wing ship. I could hear them both faintly. Then about five seconds later there was a tremendous explosion which seemed to come from behind my seat. I could hear pieces of metal tearing through the plane in several places. The cockpit was filled with dust and smoke, and for the first time I could smell the acrid garlic-like odor of the charge.

The flak had gone off just below our plane, causing it to lurch violently. The number two engine began to wind up like a siren. I looked at the tachometer and saw it passing 2500. I glanced at the pilot. He nodded. I shut off the engine and feathered the prop. Another explosion came from the starboard side. I glanced at engines three and four. Oil was gushing from the top of number three. I cut it off, too, and feathered. Casey and I were both thinking the same thing: "Did one of those explosions get number one or four?"

WE had lost so much speed that our element was far ahead of us. I saw the second element of three planes, led by Lieutenant David W. Bishop, snuggling in on our wing to give us protection from the fighters which were now swarming about.

We kept the throttles on our two engines wide open. We dived and turned until we were out of the anti-aircraft zone. But the Messerschmitts, Reggianis and Macchis were still on us. We could hear the pounding of every gun on our plane. The gunners knew that they were fighting for dear life and the sound of their guns proved it. After the first attempt, the enemy fighters decided not to press the attack. We all breathed easier when we discovered that no one on the plane had been injured and that we could hold our altitude without forcing the two remaining engines too much.

On the long journey home I suppose the Mediterranean was just as beautiful as it had been on the trip out, but somehow it didn't have the same appeal. During the entire day there wasn't anything that looked as beautiful as our home base as we circled it prior to landing.

Casey made a beautiful landing. When the wheels touched the ground "The Gremlin" swerved sharply to the left, the first indication we had that the left tire had been punctured by flak. But Casey kept the plane on the runway with the number one engine.

When the engines finally came to rest and all was quiet, Casey turned to me with a smile and said, "Those Italians really take that 'See Naples and Die' stuff seriously, don't they?"

"I think the Italians will remember today, too," the intelligence officer said as he wrote the report of our bombardier. ☆

AIR-GROUND COOPERATION IN NORTH AFRICA

(Continued from Page 6)

be heavily populated with refugees. Ferryville, itself, was packed with civilians whose pleasure in seeing the Allied commanders in the city was very genuine and quite moving. The city showed no evidence of the war at all. The waterfront area in Ferryville, however, was a twisted shambles of steel, broken concrete and sunken ships.

The road from Ferryville to Tunis was difficult; the center and sides were littered with damaged and burned out trucks, armored cars and tanks. It was on this road in the American 2nd Corps area where we had dispatched some 240 fighter-bomber sorties to work on the 15th Panzer Division when it had endeavored to move south to escape the 2nd Corps but found the 9th Corps blocking its way to Tunis and then tried to turn around and move back on the same road. The effectiveness of the fighter-bombers on the 15th Panzer Division was evident all over the road. Truckloads of rations were standing on the road showing evidence that they had been hit by machine gun fire or by aircraft. Piles of rifles were beside the road where fleeing troops had obviously thrown them. The evidence of a defeated and panicked, trapped German Panzer Division was everywhere at hand.

Tunis, itself, is a large, modern, attractive city. It also shows almost no effects of the war. For in Tunis again we had no objectives in the city but many objectives in the harbor and in the unloading facilities there. Here in Tunis, also, was a heavily populated city through which a sharp line might be drawn. On the waterfront side of the line, the effect of the war is vivid; warehouses, docks, piers, planes, ships and all waterfront installations were smashed debris. On the other side of the line is an attractive, unscathed city. Both the effectiveness of our bombers and the accuracy of our bombing is graphically illustrated.

With General Alexander and Air Marshal Coningham, we landed at El Aouina on the 9th in what was probably the first combat airplane dispatched to that airdrome without a load of bombs. El Aouina had been a principal transport operating base for the German air force. It was littered with a gratifying number of wrecked Ju-52s and Me-323s. There was also a considerable number of combat aircraft which we could fly away after very little maintenance and repair.

The Northwest African Tactical Air Force was our most completely integrated allied air establishment in the theatre. We maintained the national integrity of only two of our major units. They were the two major fighter commands in the north and in the center. The center group was an American unit which retained its original name for administrative purposes rather than any other reasons.

It was the 12th Air Support Command which throughout the battle was commanded by Brigadier General Paul L. Williams. Williams' command consisted of three of our fighter groups led by top-notch fighter commanders—our Colonels Momyer, Dean and West, and an observation unit commanded by Major Dyas. These three fighter groups are now outstanding fighter organizations and are able to meet any enemy any place in the world. It is most reassuring to know that those American groups completed the last day of the intensive operations in this battle at a greater strength than ever before. The flow of aircraft into the theatre fully met all requirements and resulted in our having full strength, battleworthy, experienced air units where one might ordinarily expect tired, worn and under-strength air commands.

The Tactical Bomber Force was an integrated unit consisting of a superb light bombardment group commanded by Colonel Terrill.

This group also included two B-25 squadrons with long experience in battle area bombing which had been moved to this front from the Western Desert Air Force, an RAF light bomber wing and French night bomber unit. The tactical bomber force was commanded by Air Commodore L. F. Sinclair, an outstanding light bomber leader whose skill and gallantry is justifying his long service throughout this war and his George Cross, DFC, OBE and several other high British decorations.

The Western Desert Air Force similarly was an integrated unit consisting of many fighter squadrons, including our excellent 57th and 79th P-40 fighter-bomber groups. The 57th and 79th had come across the Western Desert with the Western Desert Air Force and showed the skill, experience, strength and toughness which that drive across the desert had instilled in all of the components of the force. The Western Desert Air Force had a number of light and medium bomber units in it, in which our 12th medium bomber group, equipped with B-25s and commanded by Colonel Bachus was a star unit. The Western Desert Air Force was commanded by Air Vice Marshal Harry Broadhurst. Broadhurst had been one of Air Marshal Coningham's principal commanders when Coningham commanded the Western Desert Air Force in its long drive across the desert.

THUS it is seen that the Northwest African Tactical Air Force, operating directly under General Spaatz' Command, as one of the major components of the Northwest African Air Forces, was an almost integrate Allied air effort with its RAF commander, Air Marshal Coningham, and an American deputy commander, four major units, two of which were about half American and half British. The desire to respect the national integrity of air units is a real one and a worthy one. However, to win this battle, the keynote in our employment of our Air Forces was the word "concentration." When we wanted to use bombers in front of the 8th Army or in front of the First Army, we found it much more effective to direct one bomber unit into that operation than to direct an American bomber complement and a British bomber complement. We were guided solely by the military necessity that the full advantages of the ability to concentrate great masses of aircraft on the vital point take priority over all other considerations. Among the air units, the result of this Allied effort was most satisfactory. The American Command is proud of the RAF units it had the privilege to handle. The RAF Command states it was similarly deeply impressed by the American units under that command. We are assured that the Allied effort in the air when the battle requires it need not be confused by barriers of nationality.

The complete illustration of air and ground command planning and working in closest coordination may be summarized in the daily intelligence and operations conference at the combined Air-Ground Headquarters, Tactical Air Force, 18th Army Group. Each day the Ground Operations officer presented in detail the previous 24 hours' operations on the ground, and the air operations officer presented the day in the air. The ground intelligence officer then presented his concept of the enemy's current situation on the ground and the air intelligence officer presented the enemy situation in the air, after which General Alexander and Air Marshal Coningham, or in his absence, his American deputy, discussed the immediate situation and future operations. When the air and ground commanders were at the map after this daily conference, one saw the cockpit from which the air-ground war was controlled. The air commander not infrequently pointed out specific locations on the front which would improve the air situation if captured.

The ground commander would examine that particular location and if possible direct the Ground Forces to move on to those specific localities. In this manner, Ground Force support to air operations continually recurred. Similarly, the Ground Force commander would find the spot at which the ground effort had been hampered by the German air force. Normally the necessary movements were made and action taken by the air commander to further the effort on the ground in that particular location which was, in turn, air support of recurred. Similarly, the Ground Force and its final result showed to very high order the soundness of the airman running the air war and the soldier running the ground war, but working coordinately and with striking success toward the same objective.

This close teamwork by allies was not only in the air effort but in all operations of General Eisenhower's allied command. ☆

TAKING THE KINKS OUT OF TRAINING

By Col. Edward H. Underhill

DIRECTOR OF TRAINING, CENTRAL INSTRUCTORS' SCHOOL, RANDOLPH FIELD, TEXAS

WE HAVE taken pains to see that our Army Air Forces has the best team in the conference in the matter of players and equipment. Now we can devote more effort to strengthening the coaching staff. That's the reason for the Central Instructors' School at Randolph Field.

The Army Air Forces has expanded tremendously in the past three years. Naturally enough, the Flying Training Command, responsible for training all pilots, was the first to feel the effects of this growth; and the growing pains have been severe and prolonged.

Not the least of these pains was caused by the shortage of qualified flying instructors.

This problem was solved by selecting students at the advanced schools to be instructors. After graduating, they are given additional flying time and instruction and then placed on duty as full-fledged flying instructors.

That the solution was correct is proven by the fact that our pilots go to combat better trained than those of any other nation.

It did have some faults, however, and the principal fault was the short amount of time available for additional instruction. This necessitated the training of instructors at their assigned stations, which led to variations in the kind of training given them and, consequently, to the students throughout the Flying Training Command.

Some instructors would emphasize one phase of training to the probable neglect of others, either because they considered the latter phases relatively unimportant or were unable to present them correctly to the student.

The result was just as though you had a dozen cooks in one kitchen, each trained by a different chef but all trying to do the same work.

One cook might have learned to prepare some excellent egg dishes, since his teacher made a specialty of that line, but he won't be able to roast a leg of lamb. A meat expert won't be able to handle the egg dishes. So the meals won't be too consistent in quality.

Now that the expansion is not so rapid, the growing pains are not so severe; time, equipment and personnel can be spared for more thorough training of instructors.

The Central Instructors' School at Randolph was established to produce competent, thoroughly qualified Flying Instructors, and to standardize the instruction of students throughout all of the pilot training schools. All instructors in the Flying Training Command will eventually come to Randolph before they start teaching.

The best methods found in any one place will now be made available to all. We shall constantly have access to the latest information pertaining to our assignment. We will learn anything developed at any of our training fields. Three of our departmental directors have observed RAF training methods and are giving us the benefit of their findings. Men returning from combat areas will bring information of value. The instructors leaving here after receiving their training will take this knowledge with them.

Also, this school will serve as a laboratory for evaluation of new *training ideas,* or conflicting theories about existing methods. No other training field has this set-up.

In the twin-engine division, for instance, 2,000-mile cross-country flights in the C-60 type of craft are soon to become an important part of the curriculum. Pilot, co-pilot, radio operator, navigator and engineer will participate in these flights and will gain experience they could get in no other way except on long-range combat missions. This procedure is brand-new to flying training.

In the same division, the initial phase of instruction has been concentrated on disproving certain false beliefs the average trainee brings with him about twin-engine aircraft — beliefs which would nullify his ability to serve as a competent instructor were they allowed to exist.

Specifically, the false beliefs concern the AT-9 and AT-10 twin-engine planes. Many pilots believe these planes can't be safely flown when operating on only one engine. They believe it impossible to turn into a dead engine, and word-of-mouth has established a landing speed for single-engine operation of the twin-engine craft some forty miles in excess of the speed at which these planes can actually be landed.

The scarcity of experienced twin-engine pilots in the early days of this type of instruction and the guesswork basis on which qualified single-engine pilots attempted to fly multiple-engine craft gave rise to these false beliefs. Before his first week here has closed, the instructor-trainee is freed of these flying "superstitions."

Also, to accomplish more efficient training, the Central Instructors' School has set about to eliminate the "cockpit-riding" type of instructor—the fellow who attempts to instruct his students with verbal whip-lashes. Trainees are being schooled in an intelligent and understanding approach to the problems of each student. They are constantly being impressed with the fact that they must not be slaves to a tradition.

Development of curricula hence will be an important service of the School. Along with this we shall give considerable time to development and improvement of training aids, such as films, charts and mechanical devices.

A standardized course for flight instructors is introduced at Randolph

This will not be an advanced flying school. The instructor-trainees must be good flyers when they get here. They are especially selected, so they'll have to be.

However, they will learn precision in their aerial maneuvers. A man in combat may be too busy to do a maneuver in an exact fashion. But an instructor must be precise to show the student exactly what he is trying to put across.

Not all of the work is done in the air. In the ground school are taught such courses as "Analysis of Maneuvers," "Psychology and Technique of Instruction," "Operational Procedures" and "Aeronautical Equipment." Some of the courses are general and apply to all types of training. Other courses are specifically designed for a particular type of training — Primary, Basic, Advanced Single-Engine or Advanced Twin-Engine.

The means of putting across the knowledge he already has is what we are trying to give the instructors. They learn just *why* each maneuver is made, what it does for the student, and why it is in the curriculum. They are taught what abilities are necessary for each performance and what a new trick will teach the student. The purpose, technique, training value, and proficiency required in every individual act of flying are analyzed.

This analysis of maneuvers is taught in the ground school, along with psychology of instruction, operational procedure and aeronautical equipment. In the psychology of instruction, the trainee will learn to study his students' personalities, abilities, and reactions to all phases of training.

Means of instilling confidence in the cadets are an important phase of this subject. Many a potentially great flyer has been ruined or retarded because he was allowed to lose confidence early in training. Under operational procedure come such subjects as planning and supervising night flying and cross-country flights. In the courses on aeronautical equipment the instructor-trainee will learn just what can be expected, and what cannot be expected, of each part of his plane.

Instructors required for the Ground Schools and for the Military Training of Cadets are also produced by the CIS. They are given additional instruction in their specialties and instruction in methods of teaching, and in the use of training aids, films, synthetic devices, models, and so forth. A large part of their course will be devoted to actual instruction of classes under the supervision of experienced personnel.

The ground training is divided into three parts — the pilots' ground school, for the flying instructor-trainees; the ground school; and a tactical officers' school.

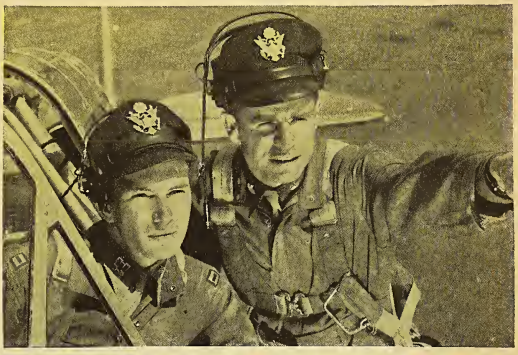
The "tac" officers' school is expected to fill another long-felt need in the Army Air Forces. It has been a problem as to how much "military" the cadets should have. In the old days, when there was more time, rigid class system was in effect. The cadets learned courtesy, discipline and responsibility through the merciless ministrations of the upperclassmen.

But we're in a war and the frills have had to be eliminated. Pilots must be turned out at the fastest rate compatible with efficiency. Hence there has been a problem of just how much time and effort should be spent on the strictly military phases of training. It must not interfere with flight training. Yet it has been shown on the war front that pilots must be able to assume responsibility and to take orders—to function as members of the *teams* essential in modern air operations. Such abilities are not stressed in the ordinary course of flight training.

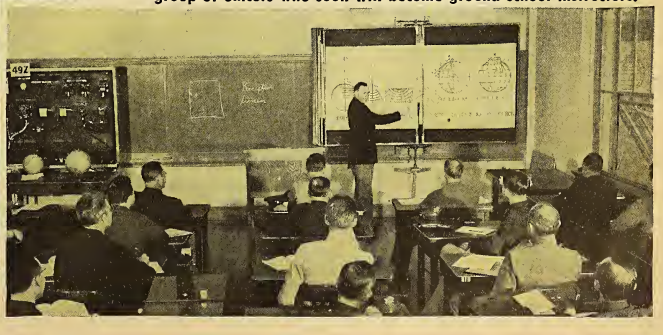
The amount of "military" training has varied greatly at the various schools. Now we are standardizing this, as well as the flight training, to assure that the cadets will become good officers besides good flyers.

All of this implies that the general level of instruction will be raised throughout the Flying Training Command and I believe that this will result. With the wealth of information, ideas and developments of every school available to us there is every reason to believe the new program will be successful. ☆

These instructors in twin-engine advanced flying at the Randolph Central Instructors' School (below) enter the "classroom" in which they teach — an AT-9. Left to right: Lieuts. D. J. Kingsbury, New York, and E. G. Harrington, Wisconsin. At right, Major E. G. Righetti, outlines a formation to Capt. W. J. O'Donnell.



Lieut. Robert H. Cuyler, former associate professor of geology at the University of Texas, lectures on maps and charts before a group of officers who soon will become ground school instructors.



SYNTHETIC DEVICES . . . BOON TO WARTIME TRAINING

TODAY more than ever before, the training problems of the Army Air Forces at war have to be met in major degree by the use of synthetic devices. The necessity for the conservation of critical materials, aviation gasoline, man hours on the part of both students and instructors, and lives of future combat pilots has called for the maximum use of gadgets which provide short cuts.

C.O.s and instructors are daily saving themselves headaches by the successful employment of synthetic trainers now available for use. Scores of officers and men and commercial engineers are working overtime to develop others which may aid in the AAF training program.

Now on display at the headquarters of the AAF Training Aids Division, Park Avenue and 32nd Street, New York City, are most of the available synthetic training devices, recognition equipment, training films and strips, training literature and posters. The demonstration is primarily set up as a shop window for C.O.s and instructors who may have the opportunity to visit the headquarters.

AFTAD's "stock" of training aids was collected from the AAF, the Army Ground Forces, the Navy, the RAF, RCAF and commercial manufacturers. Catalogs listing materials available through each section of AFTAD are being distributed to headquarters of AAF Commands and training Air Forces.

AIR FORCE from time to time will describe selected items of equipment available for training within the Air Forces.

Drift Determination Trainer

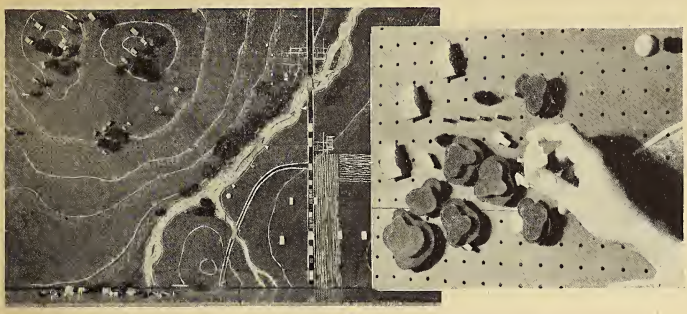
A DRIFT determination trainer has been designed to aid student bombardiers, navigators and pilots in acquainting themselves with a fundamental factor encountered in navigation. To teach students to operate a drift sight by the usual classroom method requires considerable imagination on their part. This factor is eliminated in using this device (left), which simulates drift in flight.

The trainer consists of a simple drift sight, a motor driven cylinder and a rheostat-controlled light source. The cylinder contains aerial map photographs of land and sea. In spots, the cylinder has been perforated to allow specks of light to filter through, simulating ground lights at night. A constant speed motor rotates the cylinder to give the effect of ground speed. A set of switches is provided to control the interior lighting providing either day or night problems. Rheostats control the intensity of interior lighting and illumination of the drift sight grid.

In operation, the instructor, by means of a lever on the side of the box, sets the desired amount of drift. The pupil then sights through the tube of the sight, adjusting it to determine the drift angle. Upon completion of the operation, the instructor makes any necessary corrections in the student's results.

This instrument is approximately one cubic foot and can be placed conveniently on a desk. It is commercially manufactured and operates from 110-volt light service.

(Continued on Next Page)



Tactical Board

A BOARD designed as a tactical map, (above) has flexibility in its possible uses. The board is made up of four sections, each 4 by 2½ feet. The surface of the board is plywood, finished in several layers of abrasive silicate blackboard paint of olive green color. The boards are perforated at one inch intervals to accommodate the assortment of models required in each situation. The small models are pegged, enabling an instructor to place the board vertically in front of the class for better vision.

White and colored chalk may be used in laying out a problem, and objects necessary for illustration of combat principles and problems may be applied in any desired manner. Examples of some of the peg models that are available with a board are vehicles, pill boxes, trees, bridges, high and low flying and grounded airplanes, tanks, command posts and hangars. Changing the situation on the board is easily achieved by moving the object as required. Instructors who might otherwise be handicapped by lack of practice in handling chalk on a blackboard could make a clear demonstration.

Sections of this board may be added to give a larger map and, if special terrain features such as large mountains are required, they can either be obtained with the board or manufactured locally. One of the features of this board is its visibility due to the contrasting colors and three-dimensional objects.

Automatic Rater

AN automatic rating device (left) presents to the student a series of question cards pertaining to various military subjects and automatically records his score based on correctness of answers and speed of answer selections.

When the student presses the starter button, a card appears in the window at the top of the machine. This card presents a question and several possible answers from which the student makes his selection. He then presses one of seven numbered push buttons corresponding to the answer which he considers to be correct.

The machine records a score based not only on the correctness of the answer but also the time, within a range of twenty seconds, required by the student to make the correct selection. The student is given four seconds to read the question. If he presses the correct button immediately, the "correct" light shows on the machine and he receives twenty points for that question. If he delays while thinking about the correct answer, his score is reduced one point per second. If the student presses a button corresponding to an incorrect answer, the "incorrect" light will go on and no score is recorded. The card is delivered through a chute to the student after each play. He may thus ascertain the correct answer in case he has been in error.

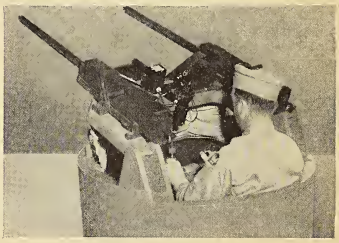
By pressing the starter button again, the student releases another question card into the window of the machine. A total of ten question cards may be played consecutively, after which the "reset" button must be pressed.

The machine may be loaded with a maximum of 800 cards at one time presenting questions on aircraft and ship recognition and a number of other subjects. Latest models of the device may employ film strips rather than cards. About 4 by 6 feet of floor space is required by this commercially produced device. A 110-volt light circuit supplies sufficient alternating current for power.

Turret Trainer

EFFECTIVE use is being made of a turret trainer in giving the potential turret gunner economical training in smooth turret manipulation. The turret closely resembles real equipment in appearance (see below) and operation and the controls are identical with those on operational turrets.

A training reflector sight or spotlight can be readily attached to electrical connections in the trainer. Patterns may be drawn or mechanical moving targets may be mounted



on available wall space (or on wires) for the student to follow. A free spotlight can be used to project a beam of light upon the target in order to observe the degree of skill with which the student manipulates the turret. In using the trainer in this manner, the 120-degree azimuth and 70-degree elevation of the trainer offer no handicap to its efficiency.

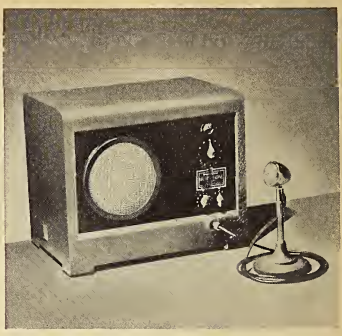
A 110-volt, 60-cycle light source operates this device. It is of commercial construction.

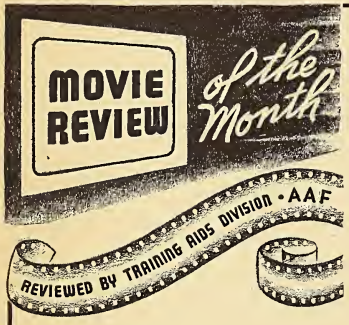
Mirrophone

As its name implies, the Mirrophone mirrors one's voice or other sounds and immediately "phones" back to an individual or group the voice or sounds recorded.

For a full minute, the Mirrophone's magnetic tape records sound of any kind—individual or group messages, conversation, music, code messages or portions of radio broadcasts. At the flick of a switch, the Mirrophone instantly stops recording and begins to play back over its loudspeaker the sounds it has picked up. The recorded sound may be reproduced over and over again. After the "repeat" switch is changed for another recording, the new sounds automatically erase the results of the previous minute of recording on the automatic tape.

Those who use radio communications should find the Mirrophone especially useful in developing clearer speech and better technique in transmitting concise and direct messages. By listening to his own voice on the Mirrophone, a pilot or radio operator who has difficulty making himself understood can criticize himself and thus contribute to a more effective communication system. An output jack on the machine permits connection with an external loudspeaker or another recording machine if permanent records are desired.





"Learn and Live"

Hollywood star Guy Kibbee, who gave his services gratis to the Air Forces training film program, dons the robe and halo of St. Peter to put across some timely lessons in flying safety in TF 1-3300 "Learn and Live." St. Peter and Joe Instructor reminisce over the earthly fate of some of the pilots who are seen wearing wings in St. Pete's Pilot's Heaven. Their conversation sets the stage for flashbacks to the pilot errors that brought a typical few of the boys into Pilot's Heaven: Hank with the empty tank, the familiar guy with propellers in his pants and in too much of a hurry to check temperature gauges before take-off, the hotshot pilot who liked to stunt at low altitude and the egotist who thought many of the routine flight orders were meant only for others, to mention only a few. "Learn and Live" is a film for all pilots, whether beginners or advanced. (For more details see Page 39.)

"Flexible Aerial Gunnery . . . Making a Gunner"

"Flexible Aerial Gunnery—Making a Gunner" (TF 1-760), released last month, shows how aerial flexible gunners are made—a survey of what goes into their weeks of intensive instruction, the tools and armament they use, a preview of what the prospective gunner can expect, a story substantiating the statement that "gunners are made, not born." "Making a Gunner" is the first of a series of six training films being produced under the general title of "Flexible Aerial Gunnery." Already complete are two others, TF 1-762 "Arithmetic for Battle" (background material for instruction in harmonization of guns and sights) and TF 1-764 "Range Estimation" (estimating target range with the sight ring). Titles of other films to be completed soon are "Bullet Between You and Your Target" and "Estimation of Lead."

"Fifty-Hour Inspection of The B-24D . . The Airplane in General"

This past month saw the release of the first in a series of aircraft maintenance and inspection training films especially designed for the ground crews who keep the crates in the air. "Fifty-Hour Inspection of the B-24D—The Airplane in General" (TF 1-818) shows the procedures followed in the first phases of the 50-hour inspection of a B-24D—washing down the plane and engines, exterior surface inspection, checking the flight controls, emergency hatches, and other details called for in columns 31, 32, 33 and 34 of Form 41-B. Four additional training films will follow at an early date, to complete the details of the B-24D inspection. In addition to this group on the B-24D, production is well along on other films dealing with the 50-hour inspection of practically all types of bombers, fighters and cargo aircraft.

"Photo Intelligence in Bombardment Aviation"

Welcome news to the bombardment intelligence officer and the air crew personnel with whom he works is the release this month of a new AAF training film, "Photo Intelligence In Bombardment Aviation" (TF 1-3306). Through the medium of a dramatic story which has its beginning at a bombardment headquarters "somewhere in England," this film depicts the role of photographic reconnaissance in air warfare, the futility of photo reconnaissance unless it is interpreted correctly, and how correct interpretation of reconnaissance photos enables the bomber crew to spot a difficult target.

(All films produced by AAF Training Film Production Units.)

TRAINING OFFICERS, ATTENTION!

Ask for them. Your command headquarters has copies for you of AAF Training Film and Film Strip Catalog—First Edition, and Supplement No. 1.

A GLIMPSE OF PILOT'S HEAVEN

Employing a novel motion picture treatment to teach a vital flying safety lesson

EVER hear of Pilot's Heaven? It's the place that flyers go who insist on learning their lessons the hard way.

Of course, nobody ever came back from Pilot's Heaven but the AAF's Directorate of Safety Education and the First Motion Picture Unit have collaborated to produce "Learn and Live," a movie that shows the place in all its detail. It's a dull, drab place. There is no flying, there are no girls and even the pool tables click with eight balls exclusively.

Undesirable as this fictional residence might be, St. Peter (Guy Kibbee) is face to face with a housing problem. Pilots are coming in faster than he and his assistants can care for them. This gives rise to an emergency call for Joe Instructor. St. Peter puts it squarely up to him to cut down the rate of entrance. By way of reply, Joe reviews how each of the present restless, unhappy inmates got there.

As St. Peter listens to these stories (dramatized on the screen) of carelessness, inattention and mistakes of all kinds, he occasionally is moved to observe, "The devil you say!" Whereupon his neon halo flickers and goes out only to re-light brighter than ever for the next incident.

There is nothing new about the use of motion pictures in flight training, but this film is a far cry from the usual class-room presentation. Designed for use in either post theatre or classroom, "Learn and Live" is as good for entertainment as it is for the lessons it teaches. It is sixty minutes of good sense wrapped up in a neat package.

Ideally, of course, good pilots will absorb good sense without the trimmings. Likewise a hungry man will eat almost any kind of food regardless of how it looks, but if it's made attractive he will eat a lot more of the right things. Director of Safety Education, Major Robert L. Steinle, figures the same way about safety lessons. Safety isn't a bit more interesting than a raw potato. But the same things can be done to make safety attractive as can be done to make a potato practically irresistible.

Professional excellence in this film was assured by the talent of those who produced it. Guy Kibbee as St. Peter brings top-flight acting ability to the production. Most of the personnel of the First Motion Picture Unit are former top-ranking members of the motion picture industry.

The project was under the general supervision of Lt. Colonel William Keighley, chief of the motion picture division at AAF Headquarters, and Major Paul Mantz, commanding officer of the First Motion Picture Unit. One of the movie industry's top peacetime executives, Major Owen Crump, chief of the production department, produced the film, while Lieutenant Edwin Gilbert, one of Hollywood's finest writers, turned out the screen play. The musical score was created by Alex Steinert and arranged and conducted by Dave Rose, using eighty musicians now members of the Santa Ana Air Force Band.

"Learn and Live" is the forerunner of other films in which the same techniques will be used. ☆

HAVE THE BEST CREW OF THEM ALL

(Continued from Page 16)

Pilots, navigators and bombardiers aren't the only crew members to get a thorough briefing before a mission. Enlisted men are given a fill-in on details of the flight—the target, route in and out, concentrations of flak along the way and near the target, enemy fighter, airdromes, type of fighters to be expected, enemy interception tactics and the like — and later, radio operators are given a special briefing by the Communications Officer who distributes log books and several sets of signals.

Flimsies containing such information as the call sign for code, the voice call sign, all frequencies and flying control stations also are given each operator.

You can't put too much emphasis on the necessity for the destruction of all data and equipment which may be of value to the enemy in the case something goes wrong on a mission.

A THOROUGH check of all equipment is absolutely essential before taking off. In addition to the careful inspection of your radio equipment and gun, you also should check your ammunition, parachute, life rafts, clothing, escape kits and make sure the kit knife is located where it can be found quickly. This is important. Your oxygen mask may freeze and that knife will come in mighty handy when you have to cut the tube and get your oxygen supply direct—to name only one of its many uses.

As soon as the engines of a ship are started, the radio operator begins his log, and, I might say, you don't fool around with this log on a combat mission. It must be complete and accurate, and entries should be made at five-minute intervals at least. It would be a good idea for radio operators to get in as much log-making experience as possible before going to a combat zone. It is sure to prove a great help.

Once over enemy territory the radio operator breaks radio silence only on orders from his C. O. He buckles down to his gunnery job. While at his gun, a radio operator is in an excellent position to observe flak. It is his duty to call it out to the navigator, giving the place of burst by the clock system, the height and color, all of which is used by intelligence officers later.

A good combat radio operator should be able to take fifteen or twenty words of code per minute. He should have enough experience to perform minor repairs on both radio equipment and machine guns. A student should operate radio equipment as often as he possibly can and especially should practice interpolating and calibrating frequencies.

Plenty of "digging" in training will make things a lot easier when he gets across. In England an operator is given a two weeks' course in British radio procedure and a code check and he must pass the course before he is permitted to fly.

Aircraft recognition is particularly important in the European theatre. If you don't watch out you may find yourself "pouring it into" one of your own fighter escort. On several missions we were escorted by Spitfires, which to me are plenty difficult to tell from an ME-109 at a distance. At times, one or two of the Spitfires would pull up over us to show they were friendly, but any fighter plane that dived toward the formation was fired on.

It also would be a good idea to get in plenty of first aid training before going on a combat mission, learning particularly the use of morphine and what to do in case of shock. This is knowledge you are sure to have a chance to put to good use.

FIGHTING FROM A TURRET

By Tech. Sgt. Carl L. Masters, engineer

EXCEPT in case of emergency, an engineer of a B-17 operating on combat missions from England engages in a minimum of engineering and a maximum of gunnery. In my case I handled the top turret and, believe me, you can get in some good shooting from there.

The best tip I could possibly offer as a result of combat experience is KNOW YOUR GUNS—every inch of them.

In the first place, before starting out on a mission, you can't know too much about your guns when you give them that last once-over. This check-up, to my way of thinking, is the most important job of a gunner—next, of course, to his work of putting the finishing touches on an enemy fighter plane.

In England we made a practice of stripping our guns completely before a flight in order to check in detail for rust and worn parts. In this theatre don't be afraid to use oil. I remember one occasion when we were ordered to clean our guns with gasoline and then dry them thoroughly—that was all. When we took to the air there was just enough condensation to cause the guns to stick or freeze. We could fire one shot and then the guns would stick. At one point on the mission—just over the target—five guns on our ship were not working properly. In a flight of seventy planes that day, all except thirty-seven turned back due to gun or engineering trouble.

Later we found that best results were obtained fro... our guns simply by wiping them dry and giving them a thin coating of oil. It is important, too, to check the head space and the oil buffer, as well as the quantity of oil in the buffers to make sure they are full.

Don't rely solely on the other fellow in figuring your turret is operating properly. Specialists give the turrets a thorough going over the night before a mission, but we always made it a practice of checking their operation with the aid of a portable energizer. The energizer provides electric current which builds up the necessary hydraulic pressure to run the turrets for this check.

Gunners should be at their positions from the time the ship leaves the field until it lands again. Be on the alert always. Enemy planes can come at you anywhere, any time.

The top turret gunner has a responsible job. He has a good view of everything happening above and on either side of the ship and he must continually sweep a full 180-degree range, depending, of course, on his plane's position in formation.

On our early missions last fall fighters were coming in head on most of the time. I got plenty of action then simply by telling the pilot to dip the B-17's nose a little. The one sure enemy fighter I have to my credit is a FW-190 that came in that way. When the enemy pilot turned to duck out of it, I let him have a good squirt right along the 190's belly.

LATER, however, the fighters began coming in out of the sun. They would begin firing directly out of the sun and sometimes would be within 200 yards before we could see them. We tried putting burnt cork around our eyes to cut down the glare, the same as in football, and it helped a lot.

It's a good idea for all gunners in a crew to feel at home in all gun positions. You can never tell when somebody handling a particularly hot position is going to get knocked out and you will have to take his place. On the St. Nazaire raid, our two waist gunners were hit by flak and Sergeant DeBoy, our radioman, went back to take care of both waist guns while the co-pilot took over the radio gun. In this way we were still pretty well defended.

Coming home from a mission the top turret gunner is apt to get his roughest work because enemy fighters are usually lying in wait for the formation as it comes back off the target. In the European theatre you can count on fighters following you back to their own coast. We even had them follow us to within thirty miles of the English coast over the North Sea. The top turret gunner should stay in the turret until his plane begins circling the home field.

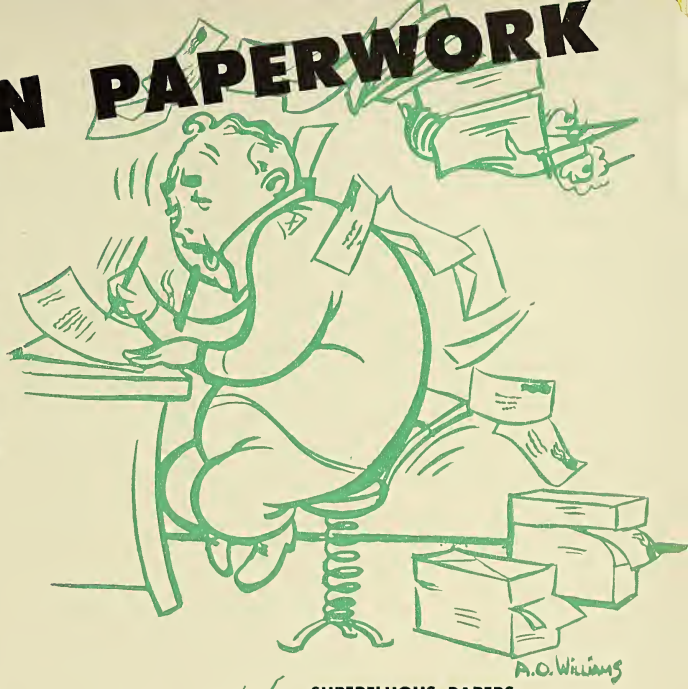
About the only thing a gunner has to do at the intelligence interrogation is to claim any enemy planes he shot down. It is a wise idea never to claim a fighter unless you are absolutely sure it was destroyed. Intelligence might check off enemy fighters in that particular area and the next time you and your buddies go over that territory you may be jumped by a lot more fighters than your intelligence officer warned you of. There's no glory in claiming an enemy fighter—your primary objective is bombing, not shooting down fighters—and if you claim too many you are only making it harder for yourself and the rest of the crews to gauge your opposition.

When you finish the interrogation, don't call it a day and head for the barracks. Go to the armament shop and clean your guns. There may be a mission again the next day, and it's a comfortable feeling to know that your guns are OK. ☆

PRINTED IN U. S. A.

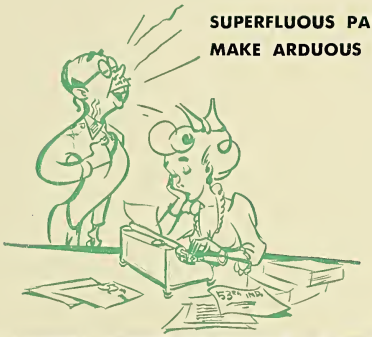
"PAU" ON PAPERWORK

The war on paperwork, that old Army hairshirt, has spread even to Hawaii, the land of grass skirts and leis. From the pen of Lieutenant A. O. Williams of the Seventh Air Force have come these lively sketches intended to encourage elimination of reams of unnecessary memoranda, letters and indorsements. "Pau" in its literal sense is Hawaiian for "end," "complete" or "finish". In this instance, for all practical purposes, it might well read, "Phooey on Paperwork," or, if more dignity is preferred, "Let's End Useless Waste of Time."



SUPERFLUOUS PAPERS
MAKE ARDUOUS LABORS

DON'T CAUSE A GREAT PREPONDERANCE
OF NEEDLESS CORRESPONDERENCE!



THE SADDEST WORDS OF TONGUE OR PEN—
"INDORSE THAT LETTER BACK AGAIN!"

DON'T USE THE PHONE FOR IDLE CHATTER,
OR CLASSIFIED, IMPORTANT MATTER;
BUT FOR ALL ELSE, FOR GOSH SAKES GRAB IT!
GET THE TELEPHONING HABIT!

TELEWOMAN MAY BE MORE FUN,
BUT A TELEPHONE JOB IS QUICKER DONE!

YOU NEVER KNOW!

HE may be the most friendly guy in the world. Patriotic too. Chances are he is genuinely interested in soldiers and in the war effort. But he likes to talk, likes to ask questions; almost everyone does. And soldier talk is the kind of talk people repeat. Your words may be innocent enough at the time, but sooner or later they reach enemy ears. Talk like yours, pieced together with other loose talk, forms a pattern. Suddenly it becomes dynamite.

Then again, this seemingly friendly guy may be an enemy agent. You know the answer to that one.

So be smart, soldier. Don't discuss military matters, no matter how trivial, with anyone—friend or stranger. YOU NEVER KNOW what your talk will lead to.

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

AUGUST 1943

Vol. 26 No. 8

AUGUST 1943

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AIR FORCE
THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

August Brief

ONE OF THE FIRST assignments for new pilots of the 14th Air Force in China is a talk with their Commanding General, Major General Claire L. Chennault. An article on what he tells them has been written for AIR FORCE by General Chennault and it appears on Page 6 of this issue. General Chennault has been fighting the Japanese air force since 1937 — as aviation advisor to the Chinese government, organizer and commander of the American Volunteer Group, chief of the China Air Task Force and CG of the 14th.

"FLIGHT STRIPS," the Army Air Forces' practical solution to the landing area problem, have become a definite factor in wartime operations. Long regarded as the "father of the 'Flight Strips' program," Colonel Stedman Shumway Hanks has taken a leading role in the development of the projects which have been set up not only in more than a dozen States but up along the vital Alcan Highway to Alaska. On Page 8 Colonel Hanks presents a progress report on the wartime significance of "Flight Strips" and explores several post-war considerations.

IF YOU'VE ever wondered what would happen to you if your bomber exploded in mid-air over enemy territory, you might be interested in the story on Page 12 which relates the experiences of Captain Frank P. Bender who had just that happen to him over Buna when that section of New Guinea was in Jap hands. His trying ordeal in reaching his base makes Captain Bender's survival story not only spectacular but highly informative. Captain Bender, who is now A-3 of a Bombardment Wing at Drew Field, Tampa, Fla., saw action in the Philippines and Java as well as in New Guinea.

TWO OFFICERS and two enlisted men recently returned from the Aleutians have given Herbert Ringold of the AIR FORCE staff a graphic description of what it means to fight Japs and weather in the northern theatre. Their story appears on Page 14.

THE AIRWAYS TRAFFIC CONTROL organization, key to the network of airways leading pilots safely "on course" throughout the United States, has never been clearly understood by many of our airmen. With this in mind, Lieut. Colonel George C. Price, chief of staff, Flight Control Command, has written an article for AIR FORCE on the organization of Airways Traffic Control, how it works and the plans underway for the future. Colonel Price's article appears on Page 22.

ONE OF THE MOST devastating raids yet made on a vital Japanese industry by AAF bombers was that which blasted enemy phosphate plants on Nauru Island in mid-April. A picture story of the raid, which was led by Major General Willis H. Hale, Commanding General of the 7th Air Force, is presented on Pages 24 and 25. The *front cover* this month shows an important step in the preparation for this raid.

THE JAPS don't like our B-26s and Major Dill B. Ellis tells why in his story on Page 30. Major Ellis returned to the United States recently after flying numerous missions against Jap installations as CO of a B-26 squadron in the South Pacific.

EVEN in the first World War, an important intelligence factor in determining enemy positions and mapping new advances was the use of third-dimensional photography by means of the stereoscope. The latest development in the field of third-dimensional photography and interpretation is the Vectograph, which permits entire groups to view pictures and mosaics of enemy territory simply by using polarized spectacles. Lieutenant Colonel M. E. Parks describes this new method and its many military uses in the article on Page 32. Colonel Parks is a technical advisor on techniques of photogrammetry and photographic equipment and development at Headquarters.

YOUR AIR FORCE this month has had a shave. The margins have been reduced and the format trimmed to afford readers more type and illustrative matter per square inch and, at the same time, conserve the paper required for each page of the publication. This trimming is accompanied by an increase in pages—from forty to forty-eight —to permit your service journal to keep pace with the expanding activities of the Army Air Forces. The increase in pages also is in keeping with numerous requests from readers for a larger publication.

AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

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CROSS COUNTRY

The manpower conservation program, and other developments of the month within the Army Air Forces.

ARE general service men at your station being used in post headquarters work, as runners and messengers, on orderly room clerical detail, for policing grounds and buildings, as motor vehicle drivers and maintenance men, as officers' mess attendants?

Official reports indicate that a large percentage of the housekeeping and service jobs at Air Forces installations in this country can be done by personnel other than those classified for general service duty—limited-service officers and enlisted men, WAACs and civilian women, and male civilians over military age or those permanently deferred.

How many officers and enlisted men in the Army Air Forces are engaged in unnecessary jobs at stations within the continental limits? How many are performing duties for which they are not suited? How many units are overstaffed for the particular job they are performing? How can officers and men in such jobs and units be made available for transfer?

The answers to these questions, and others like them, are now being developed. The heat, we are told, is definitely on. In brief a manpower conservation program is under way in the Air Forces.

The program is being directed by the newly created Manpower Division, which operates under the Chief of Management Control at Headquarters. The program in the Air Forces is part of a general War Department effort, supervised by the War Department Manpower Board, to put the right man in the right job and accomplish a reduction in military personnel engaged in non-combatant activities.

Here's a statement from the AAF Manpower Division:

"The job is two-fold: to eliminate excess manpower—both military and civilian—at continental installations; and to fill as many of the remaining jobs as possible with limited service men, WAACs and civilian women, and overage or permanently deferred males."

Obviously, a small Headquarters unit like the Manpower Division can't carry out the entire manpower conservation program in all commands of the Air Forces. Its main job is to aid in initiating studies in the commands, generally monitor the manpower surveys, analyze results and make recommendations. Surveys at selected stations will result in the establishment of ground rules, yardsticks and standards for the over-all program.

Where possible, "Exact Manning Tables" will be employed as a basis for personnel requests in place of Tables of Organization. Adoption of an Exact Manning Table means a complete and objective survey of an installation to determine the exact number of personnel required, rather than the allotments of personnel by squadrons or other group units.

Other factors involved include the elimination of unnecessary and/or duplicating reports, elimination of nonessential and the curtailment of overexpanded activities, and simplification of administrative practices and procedures.

Another Chute Missing

Base Operations, Army Air Forces Proving Ground, Eglin Field, Florida, reports a missing parachute, Type S-1, No. 42-63129. If you locate it, please return the chute to Base Operations at Eglin.

Hangar of Fame

A letter from First Lieutenant L. A. Hamilton, Tactical Officer of the Aviation Cadet Detachment at Brooks Field, Texas, tells of a special use at his station for the AIR FORCE "Roll of Honor." A "Hangar of Fame" is kept at that advanced flying school, listing all its graduates who have been decorated. So far, he writes, sixty names have been gleaned for the Brooks Field "Hangar of Fame" since AIR FORCE began its "Roll of Honor" feature. This is one convenient method by which training schools can keep track of their alumni who distinguish themselves in combat.

"As Time Goes By"

A Hollywood "idea" man suddenly found himself in the Army, stationed as a private at a West Coast base. It wasn't long before he had developed what he thought to be the answer to the Army's prayer. The next step, of course, was to

Precision Bombing

get the idea before proper authority. Laboriously he sold his brainchild through channels. Then the great day arrived and he was standing before the Colonel, a tough old compaigner. Our hero, using his best Hollywood technique, employed "terrific," "stupendous" and "colossal" with abandon. The Colonel sat unmoved. Finally, his presentation over, the Private paused for breath. It was the Colonel's move. Said he: "That idea has merit, young man. Come back and see me in six months." The Private didn't blink an eyelash. With military precision he raised his arm and stared at his wrist. "Shall we synchronize our watches, Sir?" he asked.

Mullet Key

Perhaps the most bombed and strafed group of men in the continental United States is a detachment of Army Air Forces personnel on Mullet Key, Florida.

Mullet Key lies about thirty miles off Tampa. A strip of sand, palms and beach about three miles long, it is used as a bombardment and ground strafing range. Virtually 24 hours a day, medium bombers from MacDill Field and Sarasota and fighters from the 3rd Fighter Command at Drew Field raid this peaceful island, while on a tall flagpole a red-orange flag, hung below the stars and stripes, warns ships in the vicinity to keep well away from there.

The detachment is from the 97th Aviation Squadron at MacDill Field. It is under the command of First Lieutenant R. G. Gilliland. The last we heard there were two white soldiers—Privates First Class Robert Koch of the Medical Detachment, Base Hospital, and James Manwell, a mechanic—all the rest, Negro troops.

This detachment maintains the range, keeps and reports scores from spotting towers, repairs the bulls-eye panel targets which line the beach, operates the radio, and performs other duties of a regular post. Retreat is an impressive little scene.

Facilities of the island consist of only three or four white clapboard buildings and a dock. However, the unit boasts the "smallest PX in the Army"—a large packing case with a lock on it, from which toilet articles and other supplies are sold. It does a business of about $150 a month.

None of the soldiers has ever been hit, although Lieutenant Gilliland admits that "some of the flyers are a little wild." They "can scare you a little, but never hit real close."

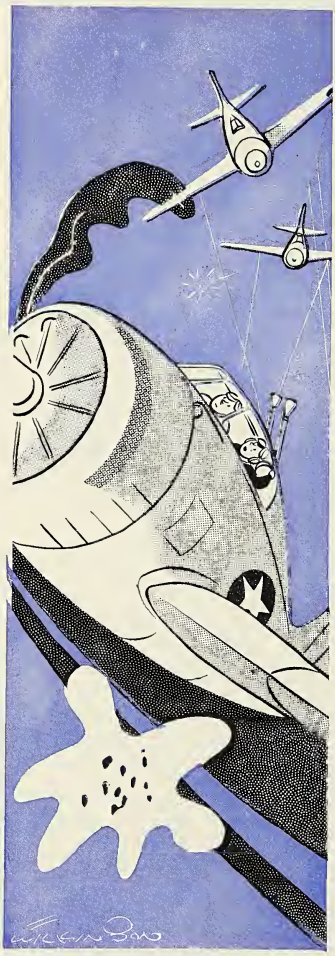
Morale on the key is as high as you'll find anywhere. For example, while the men can have frequent two-day passes into MacDill and Tampa, they practically never take them, even when urged by Lieutenant Gilliland, and their only worry is that they'll be transferred. The reason —swimming, fishing, volleyball and soft ball are all good on this clean white strip of sand and the weather is pleasant. The food is said to be absolutely tops. And the job is an important one in a country that is depending heavily on its ability to train first-rate combat airmen in a minimum of time.

Automatic Navigator

An automatic navigator that will make practically all computations for the navigator—thereby greatly simplifying dead reckoning and eliminating some instruments—is one of the latest products off the Wright Field engineering line.

Three indicators on the device continuously give air mileage, latitude and longitude. Having set the mileage meter at zero at the start of a mission, the navigator has only to take off readings during the flight to stay on course.

An averaging sextant further aids the navigator in establishing his position by celestial observation. It will record and average 100 readings of stars and planets in two minutes, virtually eliminating chance error due to speed, vibration and rough air. With the astrograph, the aerial navigator can fix his position on a chart (using the sextant readings) in one and one-half minutes.



"Scare me — I've got hiccups!"
—FRITZ WILKINSON

Doctors of Bombardiering

From the Midland Army Flying School come reports of the outstanding success achieved by former college profs and public school teachers, who were rounded up to staff the ground school classes at this bombardier "college" when instructors were needed in a hurry. These trained teachers, beyond the age of maximum combat efficiency, offered a double solution—not only could they cut the mustard from the teaching angle, but also their utilization relieved younger men for flight instruction and combat duty.

In finding a direct connection between a schoolmaster and a blockbuster, their previous unfamiliarity with bombardiering did not hamper them in the least, so we hear. It was a neat jump—from music, economics, history and chemistry to theory of bombing, fuses, analysis of results and automatic pilot operation. Of course, the teachers first went through the entire bombardiers' course, including the actual bombing of targets on the practice range.

The teachers are said to have found no important differences between instructing aviation cadets and college students, except that they say the cadets are more eager to learn and discipline is more rigid.

One exception. A former University of Wisconsin prof confesses, "We miss the co-eds."

Mix-up in Phoenix

It is told around Phoenix how Chinese cadets who came to Arizona for flight training earlier in the war unwittingly threw a scare into the citizenry. The first time the Chinese students went into the air and used their radios, they began to talk to each other over the interplane sets. Naturally, they spoke Chinese. When it was heard on the airwaves by civilian stations and others around Phoenix, it very nearly caused an alert in the city against what many thought to be a Jap invasion.

Pilot's Ten Commandments

In the columns of "The Flyer," publication of the Reno, Nevada, Army Air Base, we found "A Pilot's Ten Commandments." Here they are:

1. Seat thyself well upon thy fifth vertebra, leaving not thy fingerprints on the

controls, and chewing not on thy fingernails.

2. Know thy instruments, for they are the true and appointed prophets.

3. Follow the indications of thy instruments, and verily the airplane will follow along, even as the tail follows the sheep.

4. Do not stick out thy neck a foot; stay within the confines of thy ability, and thou shalt live to a happy old age.

5. Know the appointed words and approved methods; so if thy neck drapeth out thou shalt be able even unto thyself to place same in its proper place, upon thy shoulders.

6. Follow thy radio beam; for their ways are the happy ways and will lead to the promised land-ing.

7. Listen carefully, yea verily, to the signal impinging on thy eardrum, for sometimes they seem to have the tongues of snakes and will cross up thy orientation, to the sad state to where thou must ask Heaven itself for guidance.

8. Assume not, neither shalt thou guess, that thy position is such, but prove to thine own satisfaction such is the case.

9. Boast not, neither brag; for surely Old Devil Overcast shalt write such words in his book, and thou shalt, some day, be called for an accounting.

10. Trust not thy seat (of thy pants) but follow thy instruments; read and truly interpret the word as given from thine instrument board; know that the responsibility lieth not with the hand that rocks the control column, but in the mind that directs the hand, and thou shalt be blessed with a long and happy life.

Ceiling Zero Minus

Sailors in the Army are nothing new. The Army operates many kinds of boats for one purpose or another and they are manned by Army personnel.

But under-sea divers in the Air Forces are rare. So far as we know, there are only six of them. They are under the command of a Navy warrant officer but are personnel of the First Proving Ground Torpedo Squadron at Eglin Field, Florida, where medium bomber crews are trained in the technique of torpedo attack.

It is the function of these divers, who have full under-sea equipment and a special boat of their own, to go out to sea during practice runs, mark the places where the torpedoes sank, and later retrieve them.

Damn the Torpedoes . . .

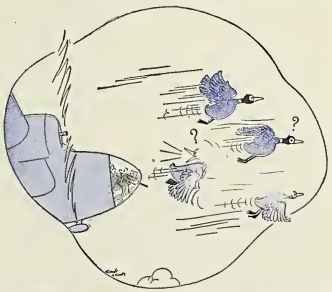
Back in the April issue we carried an article by Captain Charles D. Frazer, entitled "Night Mission Over the Caribbean," in which the author described a submarine hunt in a B-18. At one point, quoting the bombardier of that plane, the article states:

"The best time to catch (a submarine) is when he's filling his torpedo tubes. He can't dive until his tubes are closed and that gives you a little bulge on him. If he's only charging batteries, he can crash-dive on you."

We're indebted to Captain Ray D. Tarbuck, U. S. Navy, Naval Liaison Officer at the AAF Navigation School, Selman Field, Alabama, for checking that statement. Writes Captain Tarbuck:

"In the Department of Naval Forces and Operations at Selman Field the students learn that submarines do not come to the surface at all to refill torpedo tubes, because it is accomplished by breech loading within the vessel. We also teach that torpedo tubes open or closed cannot deter diving since the interlocks make it impossible to open both ends of the tube at the same time."

A checkup reveals the point in question to be worthy of further discussion. Based on information received from AAF Antisubmarine Command Headquarters, our reference to the filling of torpedo



"Scram, boys—I heard him say he's going to feather his props!"

—CPL. PAUL J. KAATZ

tubes is open to misinterpretation since there are two procedures involved in this connection: First, the actual filling of the tubes; secondly, the loading of the torpedo room with torpedoes from the deck container after the torpedoes in the room have been utilized in attacks at sea.

The Command informs us:

"The description of operation concerning interlocking of chambers and loading within the vessel concerns only the single operation of loading the tubes. But when the torpedoes are used up within the room itself, then the only place remaining to obtain more projectiles is from the deck container where spare torpedoes are kept. To reach the deck container it is necessary for the submarine to surface completely; the hatch on the deck must be opened and a hatch in the pressure hull directly beneath the deck hatch must be opened also. Cranes are wheeled into position for removing the deck torpedoes to the torpedo room immediately below. It is believed that this operation requires about two to four hours in a Nazi submarine. But, this operation is performed only once during an entire voyage lasting sometimes two to three months. Battery charging is almost a daily occurrence under average conditions. Of course, if a sub is caught with its hatches down, so to speak, the time taken to batten the hatches is many minutes before a dive is possible. Hence, in this instance of opening the hatches once in two or three months' time, the sub is caught at greater disadvantage than during the battery-charging operation, which is much more frequent."

From this we conclude that there would have been no chance for misinterpretation had the bombardier's statement been: "The best time to catch one (a submarine) is when he's filling his *torpedo room*. He can't dive until his *hatches on the deck* are closed and that gives you a little bulge on him. If he's only charging his batteries he ca.. crash-dive on you."

Blackout

As this story has it, the co-pilot of a transport was making his virgin trip over a northern run. Suddenly, at 18,000 feet, he realized that his vision was getting blurred. He had but one thought—anoxia! The co-pilot hurriedly checked his mask. No leaks. He checked the regulator. It was okay. But still it grew darker. Frantically he turned to the pilot, and found him totally undisturbed. When our co-pilot felt himself about to blackout completely he prepared to gasp into the intercom for help. But before he got the chance he heard the flight engineer's voice come in: "Damn, this is the first total eclipse I ever saw!"

A Bombardier Says

Now and then, everything on a bombing mission goes along as nice as pie until it's time for "Bombs away" and then—no bombs drop out.

Technical Sergeant John O'Brien, a veteran B-26 bombardier with more than twenty combat missions over the hottest spots in the Southwest Pacific to his credit, follows up that comment with a few others.

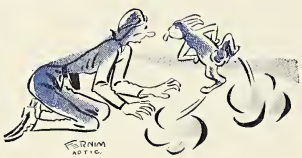
He feels that if a bombardier wants to make sure his bombs are dropped correctly, he should first make sure they are loaded correctly. He admits that sometimes it is impractical to watch personally the bombs being loaded into the rack, since this is often done while the mission is being briefed. But whenever possible, the bombardier should be on hand for this operation and not only know what is being done but exactly *how* as well. Before loading, the bomb rack should be run through two or three times to see if it is functioning properly. The bombs, he says, are ultimately the bombardier's responsibility and he should know everything there is to know about them. In this knowledge he includes the setting of the fuse and the ability to change the setting of the fuse in flight, because occasionally the original target, which

TIPS FROM THE ARCTIC DESERT AND TROPIC INFORMATION CENTER

PHANTOM ICE. Alaskan flyers have reported several cases of wing-icing in apparently clear air. Theoretically, this isn't possible since visible moisture in the form of subcooled water must be present to form wing-ice. AAF pilots encountering a condition producing wing-ice in apparently clear air are requested to report the following details to the nearest weather office: (a) condition of the sky; (b) temperature; (c) altitude; (d) looking at the sun—ice crystals or halo or both.

ARAB APPEAL. ***"Blood chits" are now carried by our pilots on all missions over North Africa. These are written in three languages and are intended to secure the friendship and the aid of the Arabs. They're as good as money because the natives can cash them in as a reward for helping our airmen to safety.***

KITCHEN SINK. American airmen in the Pacific area have found a fascinating study in bits of shrapnel picked up after a Jap raid. Some of the fragments are easily recognized as American in origin — nuts, bolts, scissors from a well-known sewing-machine maker, pieces of farm machinery, even two first-class radiator caps. The boys are looking for the radiators in the next raid.



JACK SPRATT. ***In Arctic regions, you can literally "eat yourself to death." There are numerous entries in the North country log about men who've eaten hare to bursting and yet lost weight day after day. Hares have little fat content, and fat is a vital part of the Arctic menu. If you're ever faced with a forced hare diet, be sure to garnish your banquet with seal or walrus blubber (or any other similarly delightful fat equivalent).***

FICKLE STORMS. ***In the Bismarck Sea engagement, the Nips had counted on an overcast similar to that which permitted the Gneisenau and Scharnhorst to escape through the English Channel. They expected an existing tropical disturbance to afford cloud cover for operations for at least five days. During the nights of March 2 and 3, however, the storm suddenly reversed its direction and made the armada look like sitting duckpins. Flying and bombing weather is at its best after the passage of a tropical storm.***

JEEP JAUNTS. The inventor of the jeep must be pop-eyed by now at the legends and deeds of his famous brainchild. But this latest one tops them all. New pastime for the boys in North Africa is shagging gazelles in a jeep, thereby solving the fresh-meat shortage and proving that the age-old saying "as swift as a gazelle" just means second gear as far as a jeep is concerned.

DID YOU KNOW . . . ***that a plane flown continuously on a course of N. 45° E. (true bearing) from New York, will eventually arrive at the North Pole . . . that Fairbanks, Alaska, is equidistant from Washington, D. C., Tokyo, and Murmansk, Russia . . . that the lowest temperatures ever recorded have been found south of the Arctic Circle?***

DESERT STATIC. To overcome the hazards of static electricity under desert operating conditions, the nose wheels of the P-38 and P-39 and the tail wheels of the P-47 and P-35 are now equipped with static inductive tires having a graphite base. These tires do away with individual conductor wires. After the war, they might be made available to college boys parked in Lovers' Lane on moonlit nights.

The Arctic, Desert and Tropic Information Center welcomes contributions from all Army personnel with knowledge of the non-temperate theatres of operation. Submit to: Arctic, Desert and Tropic Information Center, Eglin Field, Fla.

called for a setting of ten seconds delay, will be closed up and another, requiring an instantaneous setting, will present itself.

O'Brien also warns against careless handling of the bombsight, which can't be tossed around like a football. An accurate time check should also be kept and the bombsight sent into a depot when the time is up. A bombardier should develop skill in adjusting quickly to new altitudes and in instantly setting up different dropping angles in addition to knowing sight settings so well he can make a set without constantly referring to his bomb book.

Finally, O'Brien advises bombardiers in medium bombardment outfits not to get itchy fingers just before the run starts. Wait until the pilot calls "level and on course," then go to work, says he.

A "HERO" COMES HOME

Everyone expects modesty in a returning hero. When the home-town folks turn out in celebration, a hero is supposed to blush and stammer, reluctant to admit his bravery and exploits. That's why they wouldn't believe Private First Class Ora G. McClain.

Private McClain, after a knee operation that had no more to do with combat than a game of golf, received a two months' furlough early in March and departed for his home town of Greenville, Ohio. Wearing the red, white and blue ribbon, indicative of foreign service in the Western Hemisphere, and hobbling on crutches, he soon found himself the center of attention.

They stared pop-eyed as he got on the train for St. Louis. Beautiful girls and motherly women found excuses to engage him in conversation. The men regarded him with envy and admiration.

Private McClain tried to disillusion them but couldn't get to first base. After all, wasn't he an overseas veteran? Yes, he was, with a ribbon to prove it. And those crutches! He looked just the type—self-conscious in civilized surroundings after those days and nights of bitter struggle with a knife in his teeth and a bullet in his leg, cooly facing a cruel, ruthless, cunning, relentless enemy.

"But I tell you I wasn't in action," pleaded McClain. "I haven't been within five thousand miles of an enemy bullet. The reason I'm wearing these crutches is that I had to have an operation on my knee. It was a busted cartilage."

"A cartridge! A cartridge! You hear that, folks?" cried an excited man. "He was hit in the knee by a cartridge."

"No, no," said the embarrassed private. "It was a cartilage. It got floating around and giving me trouble so the medicos cut the knee open so I could have it dug out."

"It happened in a dugout," said someone in the rear of the crowd. "Must

have been a shell fragment. Got one in the elbow myself at Chateau Thierry."

"Please, please, don't misunderstand," begged McClain. "I don't want anyone to think I'm a hero when I'm not. I haven't seen a minute of action yet."

To complicate matters, a Marine, loaded down with a Japanese rifle and helmet, got aboard and immediately came over to visit, further convincing everyone in the car that the trophies actually had been captured by our Private McClain.

And so, on and on it went until they reached St. Louis. In the crowded Union Station there, police and gate guards cleared a path through which the discomfited AAF soldier hobbled in triumph. Servicemen and civilians alike stepped aside, and from all around came cheers and benedictions.

"God bless you, son," "Hip, hip hooray," and "We'll blow those monkey-faced Japs into smithereens," were some of the shouted messages. But by this time he had given up trying not to be a hero. He found it easier just to relax. So he bowed, smiled and waved in all directions to the roaring delight of the throng.

But finally he found someone to believe him. It was when he reached home. His wife. But of course she probably thinks he's a hero anyway. (Our thanks for this one to Captain Richard D. Grant, 6th Air Force.)

Good News for Prospective Fathers

The Children's Bureau of the United States Department of Labor is making grants to public health agencies of the various States in order to provide medical, nursing and maternal and infant hospitalization for the wives and children (under one year of age) of enlisted men of the seventh through the fourth grades, irrespective of legal residence or financial status.

Application forms may be obtained from State and local health agencies, home service of local Red Cross chapters, prenatal clinics, other community agencies and physicians. The form must be signed by the enlisted man's wife and by her attending physician. It is necessary that the husband's Army serial number is included.

Club Notes

Our editor in charge of the Keeping-Track-of-New-Clubs Department comes forward with fraternity news. Recently organized in North Africa among airmen is the "Point Snorkers." This new society imitates to a certain extent the "Short Snorters" in the use of a membership card, but instead of a dollar bill the "Point Snorkers" carry a five-franc Algerian note. It is furnished by the candidate for membership himself, after he has proved his eligibility by growing a mustache which points toward his ears. Once a member, a snorker cannot remove the lip adornment unless by order of higher command or upon return to the States.

Failure to produce his membership card when asked to do so by a brother snorker results in the careless member forking over five francs to all members in the immediate vicinity.

Our editor in charge of the KTONCD passes on the further tidbit that a snorker's mustache must be of such dimensions

Emblem of the "Goldfish Club" (below) is worn by RAFers who've had to swim for their lives. "Late Arrivals Club" members display the boot above, signifying they have returned to base on foot from a mission.

that it can be clearly seen from a distance of 100 feet. Major Charles R. Greening is Chief Doozer and other charter members, all members of a medium bombardment group, are Majors Farrell L. Bowen and Marius P. Hanford, First Lieutenants Lee E. Romine, Jack E. Ryan, William R. Kemp, John E. McClure and George Beall, Master Sergeant James J. Flanagan, Technical Sergeant Harvey J. Belser, Staff Sergeants Ferdinand A. Watson, Jr., Maurice A. Davis and Herbert L. Sanders, and Sergeant Philip C. Croyle.

Then we have club news from the RAF. Newest with them, we hear, is the "Goldfish Club," made up of those who have had to swim for their lives or put in "dinghy hours," as they say. This outfit has a fancy badge, portraying a white-winged goldfish on a black background skipping over two blue waves. It's worn over the right pocket of the battle dress or under the lapel of the regular blouse —like a detective's badge. The first member to bring the smart emblem of this quaint society to this side of the pond was Flight Lieutenant Johnny Tett, RCAF navigator attached to the RAF, who recently returned from two years' overseas service. He also holds membership in the ancient "Caterpillar Club" and the newer "Late Arrivals Club," to which membership is gained by returning on foot to base from a mission. The winged boot of the "Late Arrivals Club" and the emblem of the Goldfish Club are pictured here.

College Credits Explained

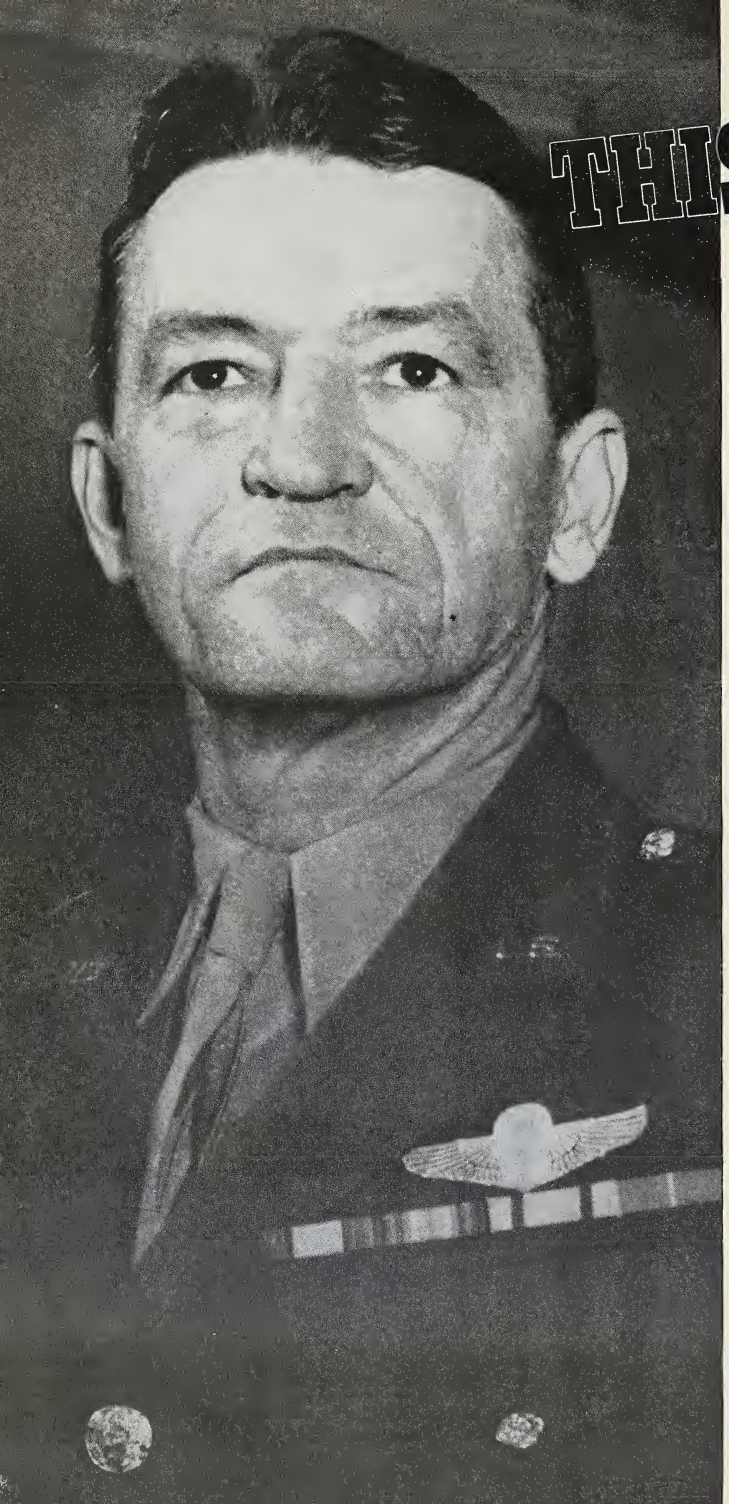
If you go back to school or college when the war is over, you can receive full academic credit for educational work taken while in the Army.

Upon completion of a correspondence course with the United States Armed Forces Institute, the Registrar will have a record of your achievement. If you finish a training course at a training school, your record can also be placed on file with the Institute. And if you enroll in a voluntary, off-duty class, you can take a special examination and have the results placed on record. The Institute will send your entire record to any school, college or employer requesting it.

For enlisted men who do not take advantage of the Institute's educational services, an opportunity is offered to take an educational maturity test. This is a survey of your general knowledge, designed to discover what you have learned during your military service which may be of value in formal school work. These tests will be administered upon request, the results recorded with the Institute, and reported to schools and colleges as evidence of educational maturity. This evidence will serve as a basis for assignment of academic credit.

The tests for use at the high school level will consist of comprehensive objective examinations in each of five major fields of educational development, including correctness and effectiveness of expression and the ability to interpret reading materials in the social studies, or the natural sciences or literature. A test of general mathematical ability will also be given.

A similar but more difficult range of tests will be established by their tryout with groups of high school seniors and college freshmen. Separate standards will be fixed for schools in different geographical regions and of different types and sizes.—The Editor.



THIS IS OUR

(An early assignment for new pilots of the 14th Air Force in China is a talk with their commander, General Chennault. Here, in part, is what he tells them.)

FLYING in China is different from anything you have ever done. Your training has been good, but you have a lot more to learn. It will take at least another twenty to thirty hours in the air out here before you are ready to fly missions.

Your first problem is to learn how to find your way around China. Getting lost over China is a simple matter. Most terrain patterns look alike. It is almost impossible to tell one valley or mountain range from another. Rivers, terraced rice paddies and villages all look alike. There are few landmarks and fewer names on Chinese maps that can be readily recognized. Roads and railroads are scarce.

Weather changes rapidly and violently. You can seldom fly for 100 miles without encountering a weather change. Under these conditions pilotage is almost impossible. Much of your flying will be on instruments, and you must rely entirely on radio and compass for navigation.

If you get lost don't waste gas flying a straight course. The minute you get into trouble circle for five minutes. We have a radio reporting net that will pick you up and give you a course to the nearest base. This net extends throughout China and also gives us weather reports and air raid warnings. The Chinese people have been well trained in the operation of the net. It has functioned well for several years. When you get into trouble you can depend on it.

Scores of our planes have been guided safely home by the net. Many of our men who have been forced down have been found by operators of the system. If you make a forced landing, don't wander away from your plane. The net will report your landing and dispatch friendly Chinese to find you.

In combat you are part of a team. Never forget that. Teamwork is the basis of all our tactics and one of the principal reasons for our low losses. Our fighter tactics are based on the fact that two planes working together are more effective than three or four planes fighting as individuals. My men have fought against odds of five and ten to one with these tactics and won consistently with small losses. They have been proved in battle and the Japanese don't like them.

Our bombing missions call for even more teamwork, precision and air disci-

BATTLE PLAN

By Maj. Gen. Claire L. Chennault

COMMANDING GENERAL, 14TH AIR FORCE

pline. Day bombers never go out without fighter escort. We have worked out a system of escorting bombers that makes it impossible for Jap fighters to get at our bombers without first tangling with our fighters. This gives our bombardiers the time and security for deliberate and accurate runs over the target. As a result, our targets take a beating and we seldom lose a bomber.

You must use the strong points of your equipment and deny the enemy the advantages of his equipment. Each type of plane has its strong points and weaknesses. The pilot who can turn his advantages against the enemy's weakness will win every time. You can count on a higher top speed, faster dive and superior firepower. Japanese planes have a faster rate of climb, higher ceiling and shorter radius of turn.

Japanese fighter planes were built for turning combats. If they can get you into their kind of fight they are deadly. Use your superior speed and faster dive to make a pass at your opponent, get in a quick burst and then break away. You have the edge in that kind of combat. All your advantages are brought to bear on the Japanese deficiencies. Never get into a long continued turning combat.

You need to sharpen your shooting eye. Nobody ever gets too good at gunnery. The more Japs you get with your first bursts, the fewer are left to jump you. Accurate gunnery saves ammunition. Your plane carries a limited number of bullets. There is nothing worse than finding yourself in a fight with empty guns.

You will face Japanese pilots superbly trained in mechanical flying. They have been drilled for hundreds of hours in flying precise formations and rehearsing set tactics for each situation they may encounter. Japanese pilots fly by the book. They have plenty of guts but lack initiative and judgment.

They go into battle with a set tactical plan and they stick to it. Their bombers will fly a tight formation through the toughest pursuit as precisely as though they were in an air show over Tokyo. Their pursuits always pull the same tricks. God help the American pilot who tries to fight them according to their plans.

The object of our tactics is to break their formations and make them fight according to our style. Once the Japanese pilot is forced to deviate from his plan, he is in trouble. They lack the ability to improvise and react instinctively to new situations. Their rigid air discipline can be used as a strong weapon against them.

The Japanese pilots you will face over China are only slightly less skilled than those we fought two years ago. The Japanese seem to have speeded up their training program to meet the demands of combat. As a result, their newer pilots lack the polish of the older China veterans.

All Japanese pilots are good gunners. They use deflection shots almost exclusively. However, their guns don't have the range or destructive power of American aerial guns. The Japanese 20 mm aerial cannon is heavier than any of the guns we carry out here, but it lacks the range of our .50-caliber machine guns due to a low muzzle velocity. Japanese aerial armament is generally not effective at a range of over 200 yards.

Japanese planes are still made from good materials, but the workmanship is not up to the standard of the materials. The light materials that give enemy planes their maneuverability also make them hard to maintain. The light parts won't stand repairs. Even slight damage will put a plane out of commission. They don't hold up under heavy fire.

Our planes can take a beating and still be patched up to fly and fight again. Many times the ruggedness of our airplanes was all that kept us in the fight.

China has been at war for six years and Chinese pilots have been in the battle from the beginning. Some of these veterans will be fighting with you in American planes. Other Chinese pilots have received the same training in American flying schools as you did. They are good pilots and do their job well in battle.

In the early days of the Sino-Japanese war the Chinese pilots fought Japanese bombers to a standstill as long as their planes lasted. Over Nanking in 1937, they shot down 42 bombers in two weeks while losing only six of their own planes. They forced the Japs to try night bombing and then, with only a week's training in night flying, they went up as night fighters and stopped the new Japanese assaults. One Chinese pilot got three bombers on his first two night flights on consecutive nights.

Chinese pilots were the first to fly over Japan and the first to raid Formosa. They did that in 1938 with Martin B-10 bombers. Chinese pilots have plenty of nerve and are superior to the Japanese in individual combat. They have better judgment and headwork in rapidly changing situations. The Japanese are better in formation work.

Six years of invasion have sowed bitter seeds of hate in China. The Chinese will never stop fighting until the Japanese are driven from Chinese soil. One of the reasons for China's resistance to the Japanese lies in the fact that every Chinese has something he considers worth fighting for. Even the poorest coolies with only a dirt mud hut will fight to keep it. You can never conquer a nation like that.

And that's something for you to remember. ☆

Somewhere in China, Lt. Col. Herbert Morgan, Major Gen. Claire L. Chennault, Col. Robert L. Scott, Jr., and Col. William E. Basye (left to right) go over plans for a bombing raid in a last-minute field conference.

THIS IS OUR BATTLE

By Maj. Gen. Cla

COMMANDING GENERA

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"FLIGHT STRIPS" FOR WAR AND PEACE

By Colonel Stedman Shumway Hanks

PROJECT OFFICER FOR 'FLIGHT STRIPS,' ARMY AIR FORCES

A NUMBER of unassuming but important patches of concrete have appeared since the start of the war in the countrysides of more than a dozen States and up along the Alcan Highway to Alaska.

These are "Flight Strips"—the Army Air Forces practicable and workable solution to the problem of developing properly located and adequately maintained landing areas.

The "Flight Strip" program has definitely progressed beyond the experimental stage. I state that with meaning. It has been my good fortune to act as Project Officer for the program since its birth and to have followed it closely, step by step—or inch by inch—ever since. So often have I discussed it in the future tense that it is a pleasure to report on actual accomplishments and on what experience has shown regarding future possibilities.

Now it can be reported that the "Flight Strip" program has surpassed our fondest expectations. Moreover, I have reason to believe that it will prove to be one of aviation's most far-sighted developments.

First and foremost is the wartime utility of "Flight Strips" in this country. "Flight Strips" today are being used by the Army Air Forces in several aspects of flight training, in tactical operations including the dispersal of military aircraft, in anti-submarine work, in the ferrying of aircraft and the transport of cargo. They have proved suitable for glider operations. They will be used as auxiliary fields in connection with the standardized control of military aircraft. And they have a special role in the air defense plans for this country.

All this is in addition to the use of "Flight Strips" as emergency fields. That the "Strips" are attaining our original objectives is evident from the reports being received.

Even before they were finished, at every "Flight Strip" site on the West Coast and in the Middle West where it was possible to land on a shoulder, planes came down on the "Strips" when it was impossible for them to reach their objectives because of bad weather or lack of fuel. The planes included a P-38 in Oregon, a Navy single-seater in Arizona, a Douglas transport in California. More than once our "Strips" have prevented bail-outs.

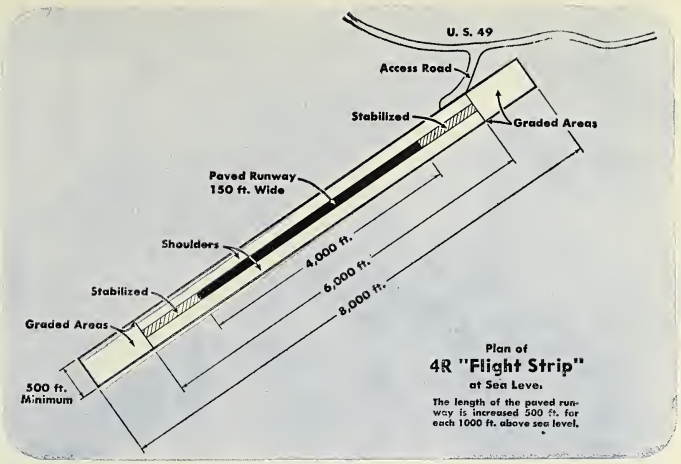
Dozens of emergency landings have since been made on finished "Flight Strips." The case of the B-25 that encountered storms while flying up the East Coast was typical. The pilot was headed for Langley Field, Virginia, but an extremely low ceiling shut him out from that airport. The home field at Dover,

Delaware, was also closed in. The pilot found that a 500-foot ceiling existed over a Virginia "Flight Strip," and brought the plane safely in to this landing area.

Perhaps the best working example of wartime use of "Flight Strips" can be found along the Alcan Highway to Alaska, under an agreement between the governments of the United States and Canada.

"Flight Strips" have for several months been in use along the Alcan Highway, and the entire "Flight Strip" program for the Highway is just about completed. They form the first chain of international landing areas.

Because of the precedent that has been established, and because the program as it applies to the Alcan Highway illustrates the newest development in "Flight Strips," it might be well to go into some detail on this phase of the operations. To begin with, it is essential to understand some of the background.



How these new type landing areas have gone to war, in this country and along the Highway to Alaska; and some post-war considerations.

THE Alcan Highway, basically, was developed as an overland route to link aircraft landing areas and not, as is generally supposed, an out-and-out truck supply route. The need for a series of landing areas from the United States to Alaska was realized years ago, and by no one more definitely than by General Arnold, our Commanding General, who in 1934 led a flight of B-10 bombers to Alaska.

General Arnold thought in terms of "Flight Strips" and instructed me to explore the possibilities of placing such "Strips" in Canada. But the Canadian government, which governed selection of the highway route, preferred to select sites for airports and to develop existing airports and build others instead of "Flight Strips." Finally the Corps of Engineers was instructed by the President to connect the Canadian airports by a road so supplies and equipment could be sent along the route.

At this point it might be well to mention the unheralded but important place aircraft and airmen have played in the construction of the road itself. Under the pressure of speed, normal road-location procedure—thorough ground reconnaissance and elaborate survey and staking work—generally had to be dispensed with. The use of aerial photographs proved to be the answer. Also, pontoon-equipped observation planes proved to be ideally suited for the early reconnaissance work.

Due to the difficulty of making surveys and locating the route, airplanes flew engineers, supplies and equipment ahead of the actual road construction. Camps were set up and the engineers began building trails in both directions. By establishing such camps by airplane along the proposed route, it was possible for construction parties to begin building the highway at many different points along the route. In all cases, the camps were supplied by plane with food, personnel and mail and miscellaneous equipment.

Then, too, the airplane was essential in case of emergency. Last fall, for instance, along the Alcan route an enlisted man had a ruptured appendix. With all other transportation facilities closed out by weather, there was no way of saving his life except by flying in medical aid. Two Army doctors were flown in to a nearby "Flight Strip." Trucks on the road lighted up the "Strip" so the pilot could land. The doctors performed the operation, the man's life was saved, and the pilot flew the doctors back to their base.

But, you may ask, what about the Canadian airports? Well, first of all, the airports are located near towns which were built up from old trading posts. Not so with the "Flight Strips," for weather and terrain are our first considerations, and vital considerations along the Alaskan route. For instance, the weather at a certain important airport along the route is very uncertain. Conditions change rapidly. If this port is closed due to zero-zero visibility, as it often is, there is a "Flight Strip" along the Highway to the north and south. A pilot can locate both these "Strips" by following the Highway. Also, the "Flight Strips" have been laid out so they can be enlarged at any time to meet our expanding requirements. This is not always true of the airports, which were originally built to handle light planes of the pioneering "bush" pilots.

Because an adequate communications service is essential for the route, the U. S. Signal Corps, at our request, has built such a communications line. It includes repeater stations and a TWX system. Then the Army Air Forces Weather Service established weather observation stations and weather forecasting stations along the route. These stations and the communications lines are coordinated with the "Flight Strips." As a pilot flies over a "Flight Strip" he can receive by short-wave radio a complete weather report, which is sent over the TWX system on the Highway for the entire route.

THE mere fact that a highway, easily discernible from the air, runs from this country to Alaska has given confidence to inexperienced personnel flying the route and has proved to have a marked effect on the morale of ferrying personnel. Markers are being constructed on the ground along the Highway route. In case pilots should get too far to the left or right of the Highway, these markers are easily visible from a distance.

Air Transport Command pilots of the Alaskan Wing now flying the northern hop use the "Flight Strips" Alcan Highway Map. This map shows them where the "Flight Strips" are located, in relation to airports, where the weather stations are, and other important landmarks easily discernible for contact flying.

Shelters have been built at each "Flight Strip" along the route. These shelters house approximately eight men. A stove, kindling wood, axe and other emergency equipment are always available in the shelter, as is the telephone connecting the "Strip" with the nearest repeater station communications system.

There is bound to be considerable difficulty with sickness and emergency situations among the personnel operating the Highway. "Flight Strips" will keep the rest camps and other sections of the High-

way in immediate contact with the larger bases or command headquarters. When sections of the road are unusable at certain times of the year due to bridges being washed out and the like, "Flight Strips" will play another important role.

"Flight Strips," by the way, are shown on all aeronautical charts by a special symbol. Two windsocks are on each "Strip" and in many cases these socks are lighted. The runway is always built in the direction of the prevailing wind.

All "Flight Strips" located on a civil airway become staging fields or auxiliary landing areas on a regular Air Transport route. Those located off civil air routes are being developed so they can be used for training without interfering with ordinary commercial or military air traffic.

All "Flight Strips" have been constructed at the request of a commanding general of one of the Army Air Forces commands and authorized by the Air Staff.

In establishing a "Flight Strip," every effort is made to obtain all available information regarding meteorological conditions in the areas being considered. In addition, local farmers are interviewed for further information regarding the peculiar characteristics of the location. Surveys must be made of at least 150 sites to be assured of obtaining fifty suitable locations.

Because many of the present Army air bases are former airports, there are various limitations to extending runways on these fields. This is due to the surrounding terrain and buildings and the proximity of the fields to cities. In many cases the cost of improving existing airports, compared to the cost of building "Flight Strips," is prohibitive.

In one of the defense commands where it is difficult to obtain sites for airfields, several "Flight Strips" are being used as sub-bases. This means that housing facilities have been erected near the "Flight Strip" area for troops. In another section of the country, approximately eight "Flight Strips" have been assigned to different Army air bases as auxiliary fields for helping the training program. The "Strips," however, remain as part of the highway system.

One air force in this country is making first and second phase stations at some "Flight Strips" for heavy bombardment aircraft to step up the training program. Reports from overseas indicate that aircraft in the various theatres of operation must frequently use landing areas where only one runway is available. Training officers are of the opinion that if pilots have been given some training on a single runway type of landing area before receiving orders for overseas duty that they are better prepared for conditions in the combat zones.

Another air force is using three "Flight Strips" for tactical operations for fighter aircraft and two "Strips" for medium bombardment aircraft.

Approximately six "Flight Strips" in one of the training commands are being lighted. This is being done by the installation of portable lighting equipment. If these "Strips" prove satisfactory in the first and second phases of training, some of them may be used as third phase stations.

The "Flight Strip" principle has been used in several overseas theatres, where their use as auxiliary landing areas and dispersion points for military aircraft has been of great strategic value.

Since the "Strips" are large and can be used by any type of plane, we are frequently asked what will prevent enemy aircraft from using these landing areas in the event of an invasion. Some "Flight Strips" are camouflaged; others are not. If a "Strip" is within a certain distance of coastlines or the Gulf of Mexico and is used regularly by our military forces, it may be camouflaged or toned down. But the point is that all "Flight Strips" must be protected, either by local civilian guards arranged for through the local communities, by the Public Roads Administration of the Federal Works Agency, or through the Office of the Provost Marshal. It may take troops and they may have to have anti-aircraft guns. The defensive strength of "Flight Strips" lies in the fact that we can have many "Strips" for use in case one of them is taken by the enemy. If the enemy takes an airport, the entire combat force is made useless.

No attempt has been made in the development of "Flight Strips" to use these landing areas as a basis for the construction of more elaborate installations. In fact, the desire to develop the "Strips" into conventional airports has been resisted in order that the value of "Flight Strips," as such, may be determined by use of these facilities as originally planned. It has been found, however, that certain "Flight Strips" possess operational characteristics which warrant continued tactical use. In these instances, housing and technical facilities have been constructed on land adjacent to the "Strips."

A final wartime consideration is the fact that less than one percent of critical items have been used in the development of all "Flight Strips" to date. This is due to the fact that the policy of using local material has been clearly established.

In addition to their wartime use, "Flight Strips" promise to play a major role in domestic post-war aviation. I will not go into that discussion at length because right now we have a war to win. But in passing I submit these few, briefly expressed thoughts.

The location of airports has paralleled the location of cities, and cities were built irrespective of weather or terrain—as they apply to aviation. Many of these airports are not only unequipped to accommodate the aircraft of the future, but cannot be expanded to handle such aircraft. We know that airports in our large cities are often closed in by purely local conditions, principally fog and smoke. We also know you can build just so many airports in a given city and that an airport can take care of just so much traffic. Assuming a substantial increase in air traffic, we can appreciate the need for auxiliary airfields outside the city belt dominated by fog, smoke and congestion. Finally, for areas not near cities, we know that the cost of constructing and maintaining the huge airports needed to handle our future planes is likely to prohibit the expansion of air traffic on a substantial scale off the established air routes.

"Flight Strips" can be built almost anywhere space is available, without regard to cities. Weather and terrain are first

(Continued on Page 48)

THESE 'FLIGHT STRIPS'

Definition

A "Flight Strip" is an area of land with clear approaches, located as a part of a highway right-of-way or adjacent to a public highway on public land, for use as an auxiliary landing area for aircraft. (Note: The highway itself is not used for the landing and take-off of aircraft.)

Procedure

"Flight Strips" are authorized by an Act of Congress and constructed by Public Roads Administration in strategical areas designated by the Army Air Forces. They are maintained by State Highway Departments following completion.

Types

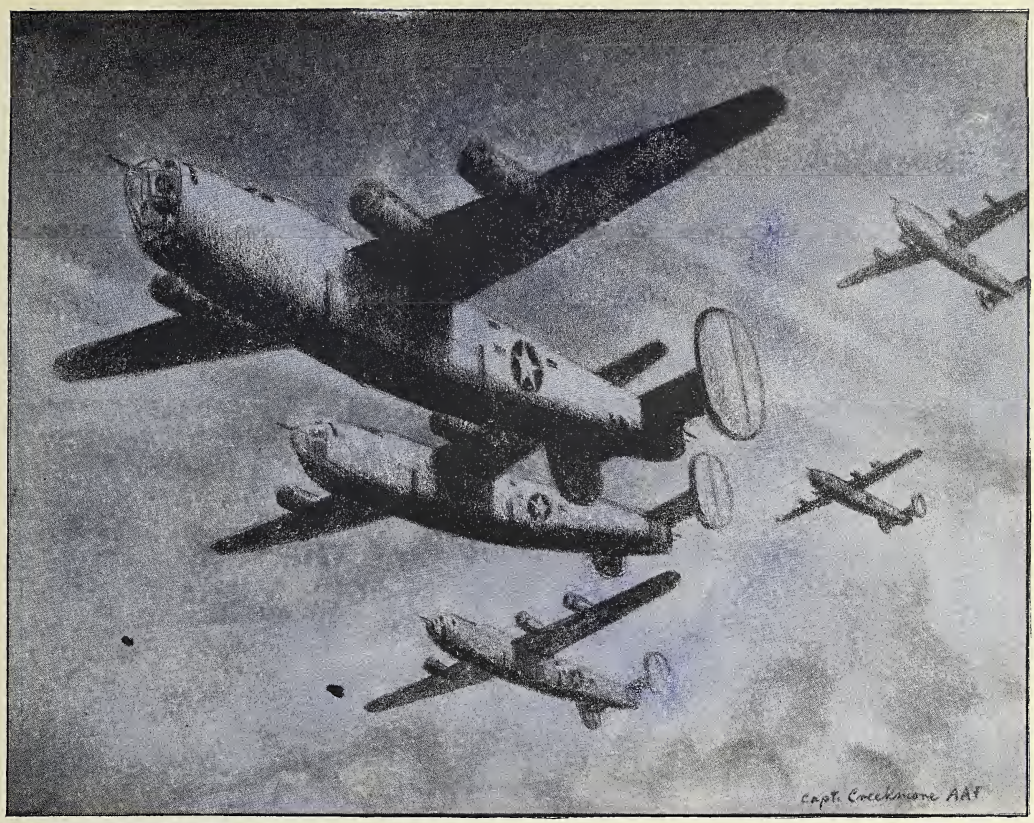
To facilitate the design, construction and description of the paved runway sections on "Flight Strips," the following lengths, widths and other design criteria have been adopted:

a. The 4R30 "Flight Strip" is for use by tactical airplanes, including medium bombardment airplanes. This type is satisfactory for use by most transport airplanes. The paved section of the runway is 150′ in width by 4,000′ in length, corrected for altitude, and designed for a gross load of 30,000 pounds.

b. The 5R74 "Flight Strip" is for use by heavy bombardment airplanes, including the B-17 and B-24. The paved section of the runway is 150′ in width by 5,000′ in length, corrected for altitude, and designed for a gross load of 74,000 pounds.

c. The 6R120 "Flight Strip" is for use by heavier airplanes than any now in operation. The paved section is 150′ in width by 6,000′ in length, corrected for altitude, and designed for a gross load of 120,000 pounds.

d. The 8R120 "Flight Strip" is used for instrument landing operations. The paved section is 150′ or more in width by 8,000′ in length, corrected for altitude and designed for a gross load of 120,000 pounds or more.



HELL OVER BIZERTE

By Lieutenant H. M. Locker

A co-pilot's story of blood and bullets in a B-24 during a bombing raid in North Africa

IT was the day after Christmas. . . . We took our regular place, number three in the last element of the formation, and off to Bizerte we went. We flew east past docks south of the town just far enough to miss the flak.

Swinging north and back west for our run on the target we could see the flak hopping all around the planes in the first element. I knew it would get worse as element after element of three ships came up to the bomb release line. And our B-24 was the last of the group.

Every plane was leaving a beautiful vapor trail to guide the flak and fighters to us. Now we were in the stuff. It was bursting all around in those greasy black puffs. Many times the ship bounced from an explosion. Someone in the rear called out, "We're hit," but no difference could be felt on the controls, and Harry Lawrence and I were busy. It was time for the bombs to go. We were loaded with six one-thousand-pounders. I watched the bomb release light blink six times.

I turned then for a look at Tom Borders, flying number two in the Birmingham Blitzkrieg, to see his bombs go. I've always had a mania for watching those beautiful golden eggs come sliding out. This time I wish I had curbed my curiosity, for just as my eyes found him there was a blinding flash and the loudest explosion I've ever heard. I saw the tail of Tom's ship fly backward; then down toward the ground five miles below. It was the only visible piece of the ten-man crew and airplane. A direct flak hit in his bomb bay had set off three tons of TNT. When the flash and smoke cleared there just wasn't anything left.

But right now we were having our own troubles. I remember saying, "Poor boys, God bless them," and, in the same instant I saw our right wing tip curl up. About three feet had been broken off by the explosion. Number three and number four engines were just starting to burn. The rest of the formation turned north to avoid the flak, but we were too busy to turn and began to fall back fast.

Right down flak alley we flew. The constantly

(Continued on Page 44)

OVER BUNA

A bomber pilot's story of survival in New Guinea.

Prepared by the Arctic, Desert and Tropic Information Center

THE flight of five B-25s scrambled off the Port Moresby strip for an egg-laying jaunt over the Jap shipping roost at Gasmata in New Britain. The date was July 26, 1942. The time: early morning.

They never reached the target area. Twenty Zeros jumped them at 12,000 feet over Buna, swarming in from every direction.

Captain Frank P. Bender saw four Zeros go down, saw one of the B-25s hit, felt his own ship shiver under a sudden blow, sensed shrapnel ripping into his left leg. The nose of his plane dropped. The wheel snapped back into his lap. With control cables dangling uselessly, the ship went into a steep glide.

Bender ordered his crew to hit the silk. The two rear gunners got out. Then the ship caught fire. The co-pilot started for the escape hatch. Bender, looking back, saw him reach into the flames for the release—and miss it, saw him sucked into a blazing hell. Flaming fabric peeled off the control surfaces. The ship went into a spin, hopelessly out of control. Bender, wedged helplessly in the cockpit, waited for the end.

The rest isn't clear. There was an explosion—perhaps the gas, perhaps the bombs or the oxygen. Bender came to, at what he thinks was about 3,000 feet—thrown clear of the ship. His eyes were fixed on an enormous object under his left armpit. He pulled it. The chute opened.

There was pain in his right knee, gashed somehow when he parted company with the ship. It didn't much matter just then. In the distance he saw the wreckage of the plane. Below him ran a stream, bordering a native garden; he could tell by the clearing and the isolated trees in the center. It looked good. He landed in a young tree on the edge of the stream; and when it broke under his weight, he slid to the ground, wrenching his back.

Bender crawled on to the jungle earth, dazed, his leg bleeding heavily. He had come down six miles from Buna. The time was 0900. He looked over the clearing. He knew there were natives about, for he could see their machetes lying around. Apparently, they had run off in terror.

As he sat there waiting, he got out his jungle kit and took inventory. Except for the bleeding mess of his right knee and the shrapnel wound on his left foot, he was all there. He still had his pistol, and his G.I. boots were on his feet. He sat there waiting.

Twenty minutes went by. He knew the natives were near for he could smell the rancid coconut oil they smeared over their bodies. He began to shout "Tabada!"—Motuan for "white friend." A child scampered out of the bush, then another. Hesitantly at first, then with growing confidence. Then came the adults, filtering back into the clearing from which they had fled. Bender began to win them over. He held out his insignia, his wings and bars. That did the trick. Some of the natives reached for them, some went back into the bush to summon others.

A LEADER came forward, the proud possessor of a few words of English. Bender came through with a little Motuan, a little English, a great deal of arm-waving, and turned on what he hoped was a winning smile. He asked to be carried to the nearest mission, motioning down the paths radiating from the clearing. The natives finally understood. But first they helped Bender reach the scene of his plane's wreckage. There he found the bodies of his bombardier and engineer, thrown clear of the smashed nose. The evidence seemed to indicate they had been killed in the air. He gave instructions to the natives for the burial. Before they left the scene, Bender ground his sulfanilimide tablets into a powder and dusted it into his wounds, using the gauze bandages from his kit. The shrapnel wound healed in time. But the gash in his knee became worse. He couldn't walk.

The natives then carried him towards the mission, arriving there at 1500. Bender found the native residents in a state of apprehension, fearful that Jap patrols might come in momentarily. The missionaries offered to hide him. Then they told him that one of his gunners had just passed through, on his way to join an Australian who knew the country and the language, and who had headed out earlier for the Owen Stanley range and Port Moresby. Bender decided to push on.

The natives built a litter for him, supported by poles. Eight natives volunteered to carry. Four of them supported the litter; two went ahead with poles, one

on each side, separating the dense foliage as they went, while the other two, up front, hacked away a path with their machetes.

As they went along, the little caravan began to grow as if by magic, until groups of twenty to fifty natives trailed along with it, from village to village. The women followed their men, carrying food and smoldering bits of coal-embers for fire-making. Children tagged along. The strange procession made its unhurried way through the bush.

On the night of the first day Bender caught up with the Australian and Staff Sergeant A.M. Thompson, the gunner, and they joined the caravan. (The other gunner apparently was captured.) The Australian produced some tobacco, and natives were paid, each with a precious half-strip—the best currency in New Guinea.

The next morning the trek began in earnest—a harrowing, humid journey of ninety terrible miles through New Guinea swamp and over the rugged Owen Stanley range to Port Moresby. The trip was destined to take three weeks.

A kind of shuttle service was set up, from village to village. The caravan would start with a fresh set of bearers at 0600 each morning and stop for the day at about 1700. The next day, a new shift would take over.

Because the Japs were reported at Kokoda, the party detoured widely, twisting through the dense growth. They averaged four and a half to five miles each day. Every foot of the going was wet, wet underfoot and wet dripping from the jungle bush. The natives fed Bender at the stops. They gave him stewed pumpkin. He hated it. But he ate for fear he might offend the bearers and the rest of the native entourage. He drank the water from the quick-running mountain streams. At first he used his iodine for purification, but as the wound on his knee grew steadily worse, he saved the iodine for dressings. He cut pieces of his parachute for bandaging and gave other pieces to the natives who prized them. He had taken his quinine regularly from the time he hit the ground, and the symptoms of malaria lay dormant (a malaria bout came three weeks later, at Port Moresby).

The experience related in this article is one of the many gathered by the Arctic, Desert, and Tropic Information Center at Eglin Field, Florida. It is the function of this organization to prepare and disseminate information on all aspects of Air Force operations (maintenance, health, shelter, clothing, etc.) in non-temperate zones. Information on forced landing procedures and survival is a major interest of the Center. All Air Force units are invited to request such information from the Arctic, Desert, and Tropic Information Center.

On they went. The wet was depressing, uncomfortable, maddening at times. The swaying of the litter was irritating. Often the bearers would run the litter into a tree where the going was rough, and Bender would cry out with pain. The natives laughed at him. They couldn't understand the white man's reaction to pain. They just went on creeping, slipping, parting the bush leisurely, ambling on childlike, singing, yodelling, yelling as they walked. The native stench steamed up from the wet. It tried Bender's nerves. At times his impatience taxed all his control. His fingers itched for his pistol. But he endured. He understood the futility of driving the bearers. Anger was useless, even dangerous. He lay in the litter, day after day, his leg wound festering dangerously, and losing weight (from 150 pounds to 105 pounds in three weeks).

As they crawled on he watched the natives live off the land. They caught birds and ate them; they cooked bananas and pumpkins, and ate coconuts; they used the jungle vines for ropes, improvised all the means for existence as they went along. It went on and on, all wet, all swaying, all pain.

Late in August the long nightmare ended. Bender entered Port Moresby. He lay for three days in a hospital bed, wondering why it didn't sway. White man's food seemed a miraculous manna to him. It was a wonderful new world. On the third day he was flown to Townsville, in Australia, and hospitalized there for three months. On the first of November, 1942, he was back on American soil again.

Today, Bender (now a Major) reviewing his experience, has this advice to pass on to airmen operating in the Southwest Pacific area:

1. The natives are the surest means through which you can survive and reach safety. In more than ninety percent of the bail-outs and forced landings in this area, natives have played the most important single role in rescue. Appreciate this fact. Here's what you can do.

a. Learn something about the natives in the area in (Continued on Page 48)

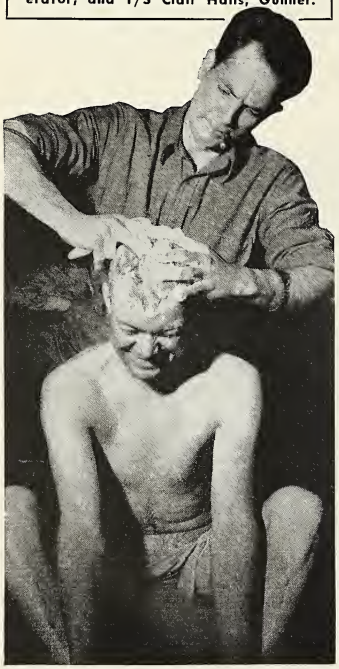
UP WHERE THE SOUP BEGINS

When the rain stops and the wind dies down, mud takes over.

AS TOLD TO

Herbert Ringold

By Lieut. William J. Wheeler, Pilot; Lieut. Graham S. Campbell, Navigator; M/S Norman C. Threewitt, Radio Operator; and T/S Clair Hails, Gunner.



Hair must be washed no matter where you are, and it's a strictly mutual arrangement.

ALL we know about the Spring push up in the Aleutians is what we have read in the papers. We were on duty in that fog-drenched island chain for about a year, but unfortunately we returned before the current hunting season started. However, our gang did a lot of softening up preparatory to the recent action.

We fought the weather more than we did the Japs. *Snafu* must have originated as a description of the Aleutian weather.

First, there was the fog. Aleutian fog has been described as the kind of weather you can cut with a knife. Don't believe it. There isn't a knife made that can go through that stuff. But, seriously, we were only ten miles from a man-sized mountain for three months before we ever saw the damn thing. We got used to not seeing the sky. When you returned from a mission, your report would invariably begin: "Well, I was flying along in the soup—."

Then there was the wind. Up there you could see the wind blowing from two different directions at the same time. That's the truth. And although it's hard to believe, we often had more than 100-mile-an-hour winds. One day the weather report read "110-mile-an-hour winds—and strong gusts!" We had to tie down the B-17s and B-24s most of the time. Either we would attach a 55-gallon water tank to each wing, or sink a steel bar or wooden plank into the snow, tie a rope around it and attach it to both ends of the ship. Even with that we had trouble. One day it took Captain Hetrick four hours to get to his target—and seven hours to get back.

And the rain. Did you ever see it rain up? It does at Umnak. When that wind decides to blow upward, everything goes with it, including the falling rain. But plenty of it came down. For days our airfield looked like a lake, with the ball turrets of the 17s all the way under water.

YES, and it gets sort of cold up that way, too. In some parts of inland Alaska it gets down to eighty degrees below zero. So at Umnak we were practically sweating with our 35 below. But your Uncle Sam is on the beam with his clothing. A standard gag concerned the polar bear that put on one of our 'parkas and died of the heat. And at times it really got up to decent temperatures. For a while, it was warm enough to play baseball and volleyball on Umnak.

To top it off we had williwaws. A williwaw is the result of strong winds building up on one side of an island, passing over the island, and pushing all its strength downward on the other side. You just don't fly through a williwaw. They can usually be found on the lee side of the islands, so stay away.

After a while you get used to the weather. But it's harder to get used to the waiting. You spend half your life waiting for the weather to open so you can do some flying. Fighting the Japs wasn't bad at all—it was the sitting

Four Aleutian veterans sing a tune of "Hang your hat on a drift meter and get down near the water."

around waiting for the chance to fight. Sometimes we'd be only twenty minutes from our target and wait for weeks to get to it. No single factor had a greater effect on the men. We used to stay in bed so long that we had a tournament to select the "sack" champion. A fellow named Hanson copped the honors with 26 hours in bed at one stretch. When it looked like the weather might clear, we maintained a constant alert status. That meant that the entire crew, except the pilot and navigator, had to stay in the ship from morning 'til night.

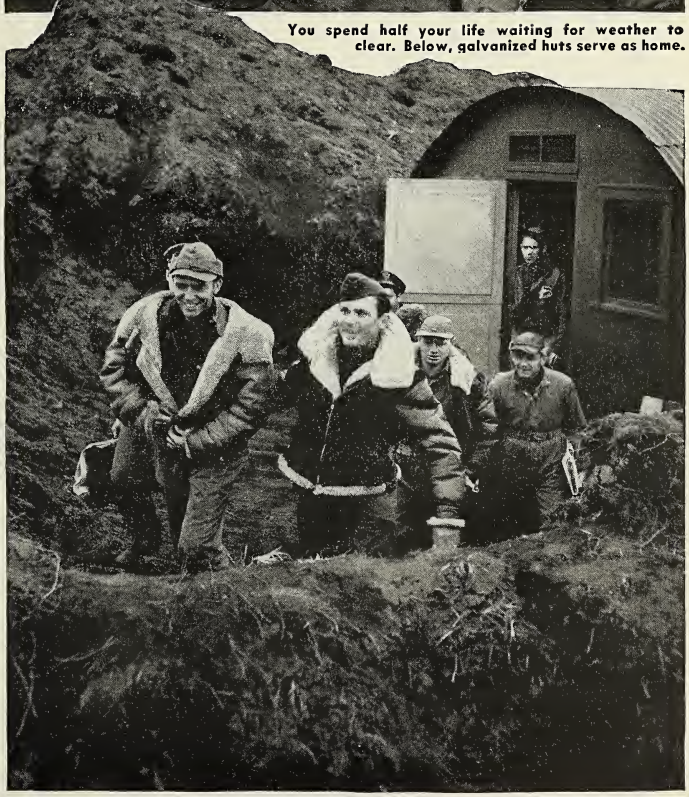
When the weather became clear enough for us to see our hands in front of our eyes, we knew there was some flying to be done. Then we'd go out on the "milk run." These were the weather flights we made to send meteorological reports back to the base every thirty minutes. We called them the "milk runs" because they were so damned monotonous. It wasn't uncommon to be flying through the soup on such runs and report back "Weather unflyable." That's how crazy it all was.

Don't think there wasn't action. Our bases up there were so close to the Japs that we didn't need a lot of flying weather to get in some bombing. When we were there, the Japs didn't have much in the way of an air force. We never saw their regular bombers. Most of the time we ran into the float type Zeros, some with bombs attached to their wings, although they didn't do much bombing this way.

Those Japs really can fly their planes. Don't let anyone fool you about that. The pilots they had up there were plenty cagey. They often turned their ships upside down to shoot at us. A Jap would come out of the clouds on his belly and start firing, make a pass and dive away, then corkscrew up for a thousand feet, shooting all the way. Once we were about 2,000 feet over Kiska harbor heading for the main Jap camp when a float type Zero took off into the wind, looped around, and fired at us on his belly. But no cigars.

While they didn't have a strong air force, the Nips must have had every ack-ack gun that's ever been manufactured. The sky was actually black—real black—from the stuff they were squirting at us. And the falling shrapnel sounded like hail on a tin roof. On one mission a gunner reported that the ack-ack was fairly light—he only saw a hundred bursts above him. And the Japs were very accurate with those guns.

Our boys got around, though. Hell, after sitting on our rear ends for so long, a little thing like some ack-ack wasn't going to prevent us from getting our regular exercise. (Continued on Page 45)



You spend half your life waiting for weather to clear. Below, galvanized huts serve as home.

CHINA'S CADETS

By Captain Charles D. Frazer

"OUR ancestors came downstream ages ago to settle China's great coastal cities. Now, because of a war we did not want, a war that was pressed upon us, we have had to carry those cities upstream."

Cadet Shah thought a minute.

"One of our philosophers once said that China, as a nation, did not fight enough. Perhaps he was correct. We do not like to fight. But we have learned and some day we will move our cities back."

This young cadet referred, of course, to the migration inland achieved by some 50,000,000 of his countrymen, a mass exodus—perhaps the largest in history—during which the gallant Chinese, following the Yangtze, carried on their backs more than 600 factories from one city alone, dragged boilers fifteen feet in diameter up the steep and cragged hills of Chungking, and so stripped the metal from the city of Hankow, for example, that not even the heavy sewer plates of its streets were left to the pillaging Japanese.

Cadet Shah is 24. His breeding and intelligence and crisp military bearing are such that you would single him out in any group of men. He has been in the war for six years, was a lieutenant in two other branches of China's armed forces and as a tank commander took part in the famous Battle of Kwang-Si Province before coming to America as an aviation cadet.

Shah it not his real name. Japanese reprisals being what they are, there is danger in names. But, more important, Shah would shrink from personal publicity. Like all his fellow cadets, he has an honest modesty that is compelling. He consents to an interview only because his background and attitude toward the war fairly represent those of hundreds of Chinese now in flight training under the auspices of the Army Air Forces at various bases in the Southwest.

WHETHER they are to be fighter or bomber pilots, the training given these men is identical with that given our own students. They fly the same planes, study the same manuals.

Generally speaking, their aptitude is about the same. They do, however, have their own mental approach to the war itself—an approach conditioned by years of struggle with inadequate weapons against a vicious and powerful enemy.

Shah was born in a coastal town, he tells you proudly, in the native province of Generalissimo Chiang Kai-Shek. He had primary education in Peking before going to Shanghai, where he attended high school and began his college course.

Stocky, of middle height and athletic build, Shah played basketball and soccer—both popular sports in China because so many can participate at such little cost. Mostly, however, he played tennis and badminton in Shanghai's clubs, where he met many British and Americans.

"Then, in 1937, when a sophomore in college, I joined the infantry," Cadet Shah explains in precise and cultured English, "and remained in that service, as first lieutenant, until August, 1938. My early preference was the Air Force but my teachers dissuaded me on the ground that I was an only son.

"While I followed this advice, I did not feel well suited to the infantry. So in 1938 I gave up my commission to become a cadet in the Army's Academy for Mechanized Forces.

"Normally, it takes a year and a half of study to be commissioned as a tank commander but in January, 1940—just before we were to graduate the Battle of Kwang-Si Province entered a serious stage, so we were released before actual graduation to take our places as second lieutenants with the 5th Army."

After five months of see-saw fighting for control of this province, the Japanese forces withdrew. During this period,

A group of Chinese pilots gets instructions from Major Hubert Zemke, translated by Lieut. W. S. Hsu.

Chinese cadets train on AAF flying lines for the day when they will move to the attack.

Shah commanded a tank in several important drives and is understandably proud of the fact that "the whole province is still clear of the enemy right now."

Shah later served as an instructor and worked with Allied advisors in the perfection of intelligence operations, the development of plans, and the like. He was promoted to first lieutenant but preferred combat service and felt that his best chance of obtaining it was as an Air Force pilot.

THE transfer was not easy; in China the Air Force is independent of the Army. But at last he obtained permission from his superiors and gave up his commission to start aerial training in March, 1941.

It was in October of that year that arrangements were made to train many Chinese air cadets in this country.

There were two principal reasons behind this. First, China had so meager a supply of aircraft and gasoline that the training of flyers was severely limited. It was far more economical to bring men here than to ship necessary planes and supplies to China. Second, many of the Chinese fields available for the purpose were unsatisfactory. The Japanese had occupied much of the country. Some of the training fields still left to the Chinese were within Japanese bomber range, and this interfered disastrously with training operations. Some were located high in the mountains, as much as 7,000 feet up, a difficult altitude at which to start inexperienced men.

Cadet Shah was in the basic phase of training when he was selected to come to the United States. Before his group could leave, the Japanese had attacked Pearl Harbor and thereby cut off the normal method of travel to this country.

The cadets had to wait. "That was heartbreaking," Shah recalls. But at last they left China in March, 1942. They flew to India, then traveled by ship to New York and finally reached Arizona.

Shah, in May of this year, was nearing completion of his advanced twin-engine training in AT-9s and was looking forward to O.T.U., with a preference for the B-25 bomber.

Why did he choose bombardment?

"I might have preferred to be a fighter pilot," Shah admitted. "It is, I think, a more interesting type of flying and offers a better opportunity for personally shooting down enemy planes, which of course satisfies the desire for revenge. But if we all took that view, China would have no bomber pilots. And training for bombardment will be the most difficult kind for China to achieve by itself."

This statement points up what is perhaps the most notable characteristic of Chinese cadets—their selflessness. The war to them is purely a cause. Their own personal futures, their lives, mean nothing. Talk to Chinese students and you will find them courteous, cheerful, studious, thoroughly disciplined and mentally concentrated upon one thing—combat.

"We have shut our minds against our homes," explains Shah, "because many of us come from cities and provinces now occupied by the enemy. We do not correspond very much, if at all, with relatives still living in occupied areas, for it is through the mails that the Japanese trace people whom they mark for reprisal. Many men have asked their parents to forget them completely. Our one aim must be to save China."

Col. C. J. Kanaga, Director of Training for the Chinese in the United States was attached to the American Embassy at Peking for four years and is exceptionally fluent in the Chinese language. He has nothing but praise for the Chinese as students of military aviation.

"The men we train are picked men," says Col. Kanaga. "Virtually all have had military academy training and have been commissioned in other branches of the armed forces before signing up as cadets. Most have had combat experience.

"THEY receive here the same training given any American boy. Primary, basic, advanced single — or twin-engine, and twelve weeks of O.T.U., generally in P-40s or B-25s.

"But along with their flight work, the Chinese have the dual responsibility of learning some English. Our policy in this respect is to teach them in daily English classes only such words, phrases and sentences as will help them learn to fly. These lessons parallel their training. For example, when a cadet begins work in a Link Trainer, his English lessons will be descriptions of how the Link operates."

Some of the cadets, like Shah, speak our language perfectly, having learned it in China. Others pick up enough for ordinary purposes. Conversely, their American flying instructors absorb some of the Chinese language. But heretofore, interpreters have been relied on for conversation between instructor and student.

"This has presented difficulties," Col. Kanaga points out, "because it prevents an instructor from correcting his cadet at the time a mistake is made. He must do it later through an interpreter. But an interpreter is not a flyer and, therefore, much is lost in the transition. The answer will be, I think, to keep some of the outstanding Chinese cadets in this country to serve as instructors in future."

An understandable yet bothersome complication of the language problem is the need for the Chinese to learn the slang of our flying lines. For instance, a student must not only recognize the meaning of "advance the throttle," let us say, but must also understand five or six of the common slang expressions used by American pilots and instructors to indicate the same operation.

Most of the training of Chinese cadets is taking place in Arizona and New Mexico, with large detachments at Luke Field, Williams, Thunderbird and Roswell, among others. These detachments, while under direct U. S. Army Air Forces supervision, have officers and enlisted men of their own.

The bulk is pilot training, naturally. Elimination is low—less than ten percent —partly because much of the elimination of unsuited cadets takes place back in China in elementary flight tests. Those men who are eliminated in this country go to other schools in the Army Air Forces, to study armament, perhaps, or observation or maintenance—some phase of military aviation which will make them valuable on their return to China.

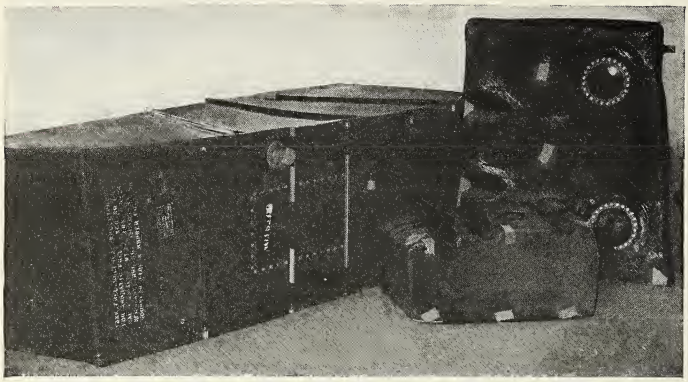
"As pilots they are earnest, studious and very capable," says Col. Kanaga. "Some men, of course, just can't get the hang of it. I remember one boy who invariably got lost on cross-country flights; he had forced landings all over Arizona, yet never so much as scratched a wing-tip. But for the most part they are good all-round flyers—'on the ball' as the instructors say."

The cadets themselves have a consuming and common urge to have our people know how much they like us and the country, and how much they appreciate the chance to train here. They are filled with wonderment at some of the things they have seen.

CADET SHAH was astonished at Arizona.

"Geography is one of my enthusiasms," he says, "and I had read a great deal about the United States. My books had informed me that Arizona was a desert country. But here we have found these wonderful irrigated valleys, with rich farms and ranches and fine cities. I know parts of China which should be like this some day."

Nobody who has met and talked with Chinese cadets could possibly question the sincere friendliness of these wartime visitors. It is a unique and warming experience to attend one of their early morning classes and to see the cadets, in trim, orderly ranks, dressed in American uniforms with the gold-and-blue shoulder patch of the Chinese Air Force, start their day by singing with a gusto rarely found anywhere the song of the AAF—"Off we go, into the wild blue yonder. . . ." ☆



Above are some typical fuel cells. Note that all fittings are covered with masking tape. Inspection doors are safety wired and cells are properly stenciled for identification.

Self-Sealing Cells

By LIEUTENANT C. G. WYMAN and J. E. NAGLE
PATTERSON FIELD, OHIO

A self-sealing fuel cell is a gasoline container constructed by building up several layers of natural and synthetic rubber.

The bullet-sealing quality of the self-sealing fuel cell is based upon the chemical principles that synthetic rubber is gasoline resistant and natural rubber is not. By control and manipulation of these factors the self-sealing cell has been developed into an efficient and practical component of combat aircraft.

Many types and varieties of fuel cell constructions are now used in service aircraft but all constructions depend upon these primary chemical principles.

Basically every self-sealing fuel cell is constituted of three parts: the inner-liner, the sealant and the retainer or cover, sometimes called the outer-liner. The average cell contains from five to seven layers of material but these layers may all be classified under one of the three basic parts.

The inner-liner is the first or interior layer. This is a synthetic rubber sheet. It is the gasoline resistant quality of this layer that allows gasoline to be contained in the fuel cell without causing deterioration or damage to the cell. Obviously, no fuel can be manufactured without a gasoline resistant inner-liner.

The sealant is the second or middle layer of material. This is a sheet, or series of sheets, of natural rubber. The sealant may be made of one or more of several types of natural rubber, generally sponge, coagulated latex or semi-vulcanized rubber compound. As the name implies, the sealant is the material which reacts with gasoline to close the puncture resulting from bullet penetration.

The retainer or cover is the outer or exterior layer. Its primary purpose is to lend strength and protection. Various types of material have been used for the retainer in past constructions. Prominent among these were leather, vulcanized rubber, fabric and rubber-impregnated tire-cording. The latter is now being used exclusively in standard AAF-approved construction.

Basically, the function of the self-sealing fuel cell is this: Upon penetration by a projectile or other object, gasoline seeps through the damaged area of the inner-liner and comes in contact with the natural rubber sealant causing the rubber to swell to many times its normal proportions. This swelling reaction closes the puncture prohibiting further gasoline leakage.

The introduction of special blends of fuel into service-type aircraft has presented a variety of difficult problems which have been overcome. However, there are many self-sealing fuel cells which were manufactured prior to the use of such fuels and these cells require additional treatment.

All self-sealing fuel cells now being used by the AAF are built with an inner-liner of one of these four materials: buna, neoprene, thiokol or royalin.

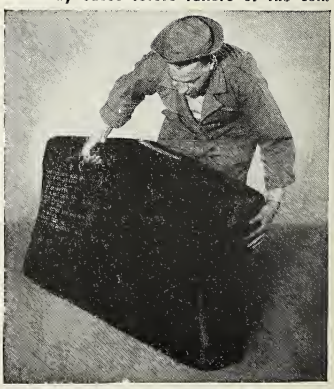
Buna synthetic rubber is resistant to special fuels insofar as actual disintegration is concerned. However, buna, by itself, is not resistant to special fuels insofar as dispersion through the liner and into the sealant rubber is concerned. Buna fuel cells now under construction contain a synthetic dam or barrier between the liner material and the natural rubber sealant. This barrier is very effective in stopping the dispersion of fuels. Buna-lined fuel cells which contain a synthetic barrier do not need to be treated in any way for special blends of fuel. All buna-lined fuel cells which do not contain a synthetic barrier must be slushed with Fuller's Slushing Compound TL-284 (AAF Specifications 3595) which is the *only* slushing compound approved by the AAF. Ethyl acetate, which is the basic solvent for Fuller's Slushing Compound, is detrimental to buna synthetic rubber, so buna lined cells should not be slushed unless required by above classification.

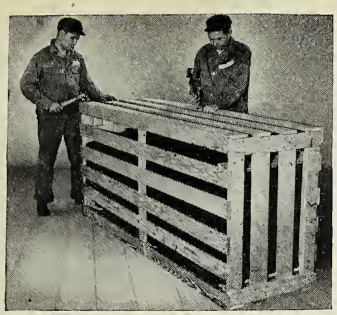
Neoprene synthetic rubber is not resistant to special fuels and will deteriorate when in contact with them. Therefore, it is imperative that all neoprene-lined fuel cells be flushed with Fuller's Slushing Compound TL-284 (AAF Specification 3595).

Thiokol synthetic rubber is resistant to all blends of fuel. None of the special blends will disintegrate or disperse through this type of liner. Thus, thiokol-lined cells need not be slushed under any circumstances, nor should they be because the ethyl acetate solvent contained in Fuller's Slushing Compound TL-284 is detrimental to thiokol synthetic rubber.

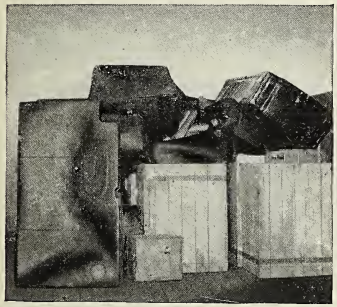
Royalin plastic, which acts in the same manner as thiokol synthetic rubber, is resistant both to disintegration and dispersion by blends of fuel. Ethyl acetate is also detrimental to royalin-lined fuel cells, which also should never be slushed.

Below is a deteriorated fuel cell. Extreme care must be exercised in re-fueling in order that no gasoline is allowed to spill or overflow on the exterior. The exterior of many fuel cells is not gasoline resistant and disintegration from contact with gasoline may cause future failure of the cell.





RIGHT. **Fuel cells which are to be shipped or stored should be crated as shown. Remember never to stack crated fuel cells so high that the bottom one is under pressure. Crate all cells so that the fittings are secured and the cell does not sag. If possible, store and ship them in their original containers. Privates Matthew Bodamer (left) and Cecil Allen of Patterson Field are shown doing a proper crating job.**



WRONG. **Never stack uncrated fuel cells. Uncrated cells should be given an individual space, placed on their widest surface and supported from the interior so they do not sag under their own weight. Never store fuel cells without properly crating them. Great harm is done to fuel cells by any change from their original shape, as collapsing, warping, bending or twisting.**

Inspection alone is not sufficient to distinguish between the various types of cells or to determine if slushing is required. The type of cell at hand may be determined only by reference to T.O. 03-10-26, which lists the construction numbers stenciled on each tank and describes the type of cell by these numbers.

Because of current discrepancies in the information previously supplied to AAF activities, a number of self-sealing fuel cells have been unnecessarily treated for resistance to special blends. Extreme caution should be exercised in the use of thiokol or royalin-lined cells which have been slushed, since it is difficult to determine the extent of damage by the ethyl acetate solvent to the liner.

Moreover, it is inadvisable to attempt to remove the slushing compound from these cells due to the fact that ethyl acetate is also the cleaning solvent that would be required to remove it. Use of this solvent in removing the slushing compound would only cause further damage to the seams and the fuel cell lining. Do not reslush fuel cells. The original slushing is considered satisfactory throughout the life of the cell.

One of the chief causes of fuel-cell failure in the past has been the disintegration of the retainer or covering of the fuel cells caused by gasoline coming in contact with the exterior of the cells.

The covering of all fuel cells now in production is being coated with buna synthetic rubber, or with a resistant lacquer to prevent deterioration caused by spillage of gasoline. But those of previous construction are not protected for spillage in any way and will disintegrate rapidly when repeatedly splashed with gasoline. The buna-coated exterior of present production cells will remedy this situation to some extent. However, because no synthetic barrier is provided under the Buna coating for the exterior covering, gasoline of certain blends eventually will penetrate into the natural rubber layers. Therefore, extreme care should be taken in all cases to avoid spillage of gasoline on the exterior surface of all fuel cells.

The main cause, however, of fuel cell failures—both in the past and at present —may be traced to faulty and careless installation and removal methods. Particularly is this true in cases concerning aircraft whose fuel cells are of the so-called collapsible type.

By the very nature of its construction, the self-sealing fuel cell is injured by any alteration of the cell from its original shape, collapsing, warping, bending or twisting. In some cases, of course, there is no alternative and collapsing the cell becomes a necessary evil. Many types of aircraft now incorporating self-sealing fuel cells were not designed originally for these cells and, as a result, cells must be installed and removed under undesirable conditions.

In view of these facts, it is extremely important that all fuel cell installation and removal work be placed in the hands of competent, trained men who understand the care which is necessary in the handling of self-sealing fuel cells. An inexperienced crew should never be allowed to install or remove fuel cells unless the job is done under the guidance of capable and conscientious supervisors.

The Maintenance Division of the Air Service Command has established a unit of trained fuel-cell experts to assist in all maintenance and repair problems on self-sealing fuel cells which arise within the AAF. Any questions or comments on fuel-cell problems should be addressed to the Commanding General, Air Service Command, Patterson Field, Fairfield, Ohio, directed to the attention of the Chief, Maintenance Division.

Boot Starter

The Bungee starter, as used by the AAF Flying Training Detachment, Ocala, Florida, consists of a boot, shock cord and rope handles. The boot, six by nine inches tapered to a point like a rounded "V" is made from two pieces of $\frac{3}{8}$ inch belting riveted together. To this is attached at the point of the "V" five feet of $\frac{5}{8}$ inch manila rope, then an eight-foot length of $\frac{5}{8}$ inch elastic shock cord. Two four-foot manila ropes go at the end for gripping pieces. To operate, the engine is primed by turning the propeller by hand, then the boot is placed over the end of the blade on the far side and needed tension is gained by two men pulling slowly, as shown in the accompanying photograph. The propeller can now be started with only a slight lift from a third man. As the propeller whirls the boot flies off. — **Flying Training Detachment, Ocala, Florida.**

The Bungee Starter in action.

Flashlight Guides Night Parachute Deliveries

To provide a means of speedy identification of aerial delivery containers dropped during night operations, the Materiel Command has developed a new type of identification lamp assembly.

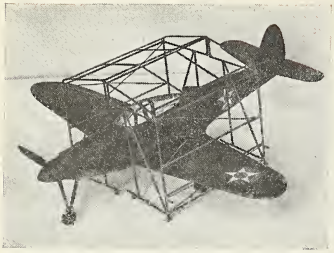
It resembles the ordinary flashlight but is made of plastic and has a light bulb at each end. Colored plastic caps of blue-green, red or yellow can be snapped over the bulb so that types of aerial delivery loads can be easily identified by means of the different colors. The cylinder holds three flashlight batteries.

On the outside of the lamp are two loops for attaching the lamp to the delivery containers. A spring contact switch on the exterior of the lamp is equipped with a fibre separator so that the switch is kept open except when the lamp is actually in use. The assembly is so arranged that when the load is dropped a cord attached to the parachute line withdraws the fibre separator from the switch and the light is automatically turned on when the parachute opens.

The weight of the lamp, except for batteries, is 5.6 ozs. *(Technique Continued)*

TECHNIQUE

(Continued from Page 19)

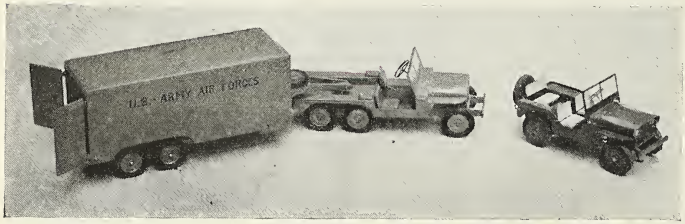


Model of a special repair scaffold.

bombers as though it were lifting a sack of wheat.

Other models include latest type fighter planes, bombers and cargo carriers, each with movable controls, instrument panels in the cockpits and hollow cabins which permit arrangement of cargo inside the planes; jeeps, peeps and a truck with three gasoline carriers attached; a small glass-enclosed portable machine shop, canvas-covered engine repair housings, a cargo truck, and a long heavy trailer much like a flatcar, a current development and only recently produced a full-sized model.

Because the models to be of value must be precision perfect, they sometimes require as long as two or three weeks to build. On such projects involving trucks and other mobile units, even the engines and metal chassis are built to exact scale.



Even extra heavy equipment is duplicated.

Designing With Models

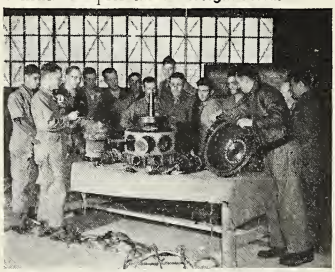
Tiny models are dictating the designs for various types of maintenance equipment, small service trucks, portable repair shops, bomb cradles and other miscellaneous field devices used by the AAF. The miniature planes, trucks, gasoline storage tanks, portable houses and other airborne equipment, all precision-built to one-thirtieth exact scale, are daily saving the government thousands of dollars in its never-ending task of finding the best possible equipment for our combat Air Forces.

"Building the models first," one engineer explains, "makes it possible to study desirable shapes and sizes for the large equipment without going into the tremendous cost involved in the building of full-sized products."

The plant for the construction of these models is a small workshop in the big Miscellaneous Equipment Unit of the Materiel Command at Wright Field, where the models are scaled down by draftsmen from full-sized blueprints furnished by various manufacturers and then built of wood and metal. They range in size from a tiny one-inch bomb cradle to a three-foot scale model of a four-engine bomber complete with retractable landing gear.

One of the most delicate models is a six-wheel truck-trailer combination so complete in detail that the truck even has a tiny rear view mirror. Another intricate model comprising hundreds of small parts is a replica of a huge crane whose real life version is used to haul around 25-ton

Models of special scaffolds used in repairing various parts of aircraft have been especially valuable. These framework devices, simple in construction, have been manipulated into various positions on the model planes just as the large repair stands would be on regular aircraft, and the results have given engineers knowledge enabling them to build super-structures that make repairing a combat plane a much simpler task.—**Wright Field.**



Training continues behind the front lines.

Tech School in Combat Zone

One of the few (possibly the only) AAF technical schools in a foreign theatre or combat zone was established several months ago along the North Atlantic Route by a ferrying squadron of the Air Transport Command to take worthwhile advantage of the enforced inactivity due to weather conditions.

Sixty-five enlisted men have already benefited from instruction received in the school, which was organized at the suggestion of enlisted personnel and through the cooperation of the commanding officers and top-rated N.C.O.s.

The program covers studies of aircraft engines, general airplane maintenance and engine maintenance, serves as a refresher course for older men and develops skilled mechanics out of the basics.

Since its beginning the course of instruction gradually has been expanded to include a study of steps necessary to complete a successful 25- and 50-hour inspection, the use of tugs and heavy tractor equipment, operation of wing jacks for four-engined planes, and instruction on instruments and electrical systems. Schedules are arranged to enable men on night shifts to participate. In addition to technical phases, one hour daily is devoted to the study of manuals and T.O.s.

Credit for organization of the school goes largely to First Sergeant Roland F. Grisson, Master Sergeants George Gromoshak and William H. Kelly, Staff Sergeants John Ramsey and Arnold King, and Sergeant Joseph Verdun. They also served as instructors. Lieutenant Wilber Hamstreet, Squadron C.O., and Lieutenant Charles D. Horvath, adjutant, gave full approval and assistance.—**Air Transport Command.**

High Altitude Brushes

An intensive five months' research program stimulated by complaints that brushes on generators and engines were wearing out within two or three hours on planes flying at extremely high altitudes has resulted in the development of new brushes with an effective high altitude life of from 40 to 150 hours.

Two B-17s, assigned to the project at Wright Field, rolled up a total of 500 hours of comprehensive testing in 107 flights, after it was determined in earlier experiments that brushes operated satisfactorily in high altitude test chambers but wore out after a few hours of actual operation above 25,000 feet.

The Engineering Division called in electrical technicians from all manufacturers capable of supplying materials, motors and generators, and in October of last year began a series of high altitude test flights in rarefied atmosphere above 30,000 feet.

One of the B-17s was converted into a flying electrical laboratory. Panels of testing instruments, installations of generators and motors for tests under observation, temperature recording gauges, and many electrical recording devices were mounted in the radio compartment and in the bomb bay.

Flight after flight was conducted, those over 30,000 feet usually of three hours' duration. Civilians and officers spent

their days "upstairs" testing new materials and new designs, recording instrument readings of the hundreds of variants of the flights, and observing how generators and motors survived under increasingly heavy electrical loads. In the evenings all observations and readings were reviewed and worn-out materials were thoroughly examined and tested.

It was discovered in the early stages of these tests that motor and generator parts were wearing out at high altitudes because of friction resulting from a lack of lubrication. This factor was not present at lower altitudes, because while the air at high altitudes is almost absolutely dry, that at lower altitudes contains sufficient moisture to serve as a lubricant for the brushes.

Before a satisfactory brush had been developed, 27 different brushes were tested, not including those which were proved unsatisfactory in laboratory and high altitude chamber tests.

Flight tests were completed in March with the perfection of brushes capable of operating from 40 to 150 hours efficiently and continuously under heavier-than-normal loads at altitudes above 30,000 feet. This development assures a constant supply of electrical current to operate guns, turrets, automatic pilot, props, radio and other equipment in aircraft at high altitudes. — **Lieutenant Robert V. Guelich, Wright Field.**

Swapping Engines

A shortage of R1820-51 engines made it necessary at Hendricks Field, Florida, to modify B-17Bs to permit use of R1820-65 engines. This tricky problem was solved by Glenwood A. Schaefer, 25-year-old civilian employee at the 95th Air Service Command Sub-Depot.

Here's his solution, reached after days of studying the standard Boeing cowl flap assembly:

An Adel type G-9744 cowl flap selector valve was installed on the cockpit sidewall, to the co-pilot's right, forward of the thermo-couple selector switch.

Pressure and return lines were connected from the selector valve to the hydraulic system. To control the time required for opening or closing the flaps, the pressure line was passed through a variable restrictor valve before connecting to the selector valve.

Eclipse Type A-13 supercharger regulators, which operate from engine oil pressure, were installed in place of the original Type A-7 regulators which operate from the hydraulic system. The hydraulic lines running from the bomb bay to the outboard nacelles for operating the original supercharge regulators were used for operation of the cowl flaps on the outboard engines by capping the Tee fittings where the inboard regulator lines connected. This resulted in one continuous line from the bomb bay to the outboard nacelles.

Lines were then installed from the bomb bay ends of the former supercharger regulator lines to the selector valve and from the nacelle ends to the cowl flap cylinders.

These installations provided a complete system for fluid to pass from the pressure system, through the restrictor valve, to the selector valve, thence to the bomb bay, through the former supercharger regulator lines to the cowl flap actuating cylinder. The fluid displaced by the movement of the piston in the cylinder, passed through the other former regulator line into the bomb bay, forward to the selector valve, then through the line connecting the selector valve to the return line from the brake system, and into the hydraulic reservoir.

New lines were then installed connecting the selector valve to the inboard engine cowl flap actuating cylinders. This completed the installation.

With this new cowl flap arrangement, each flap is operated independently and may be locked in any position. The operation may be accomplished either when the engine-driven pumps are supplying the system with pressure, or when the emergency hand-pump is used.

Through Schaefer's development, modification of B-17Bs at Hendricks Field has been expedited considerably and the operation of the modified Bs has proven more satisfactory. — **Private Charles M. Watt, Air Service Command.**

Link Spin-Delay Mechanism

An attachment for Link Trainers which permits instruction on instrument take-offs is the invention of Technical Sergeant Sherman A. Holbert, Moody Field, Ga.

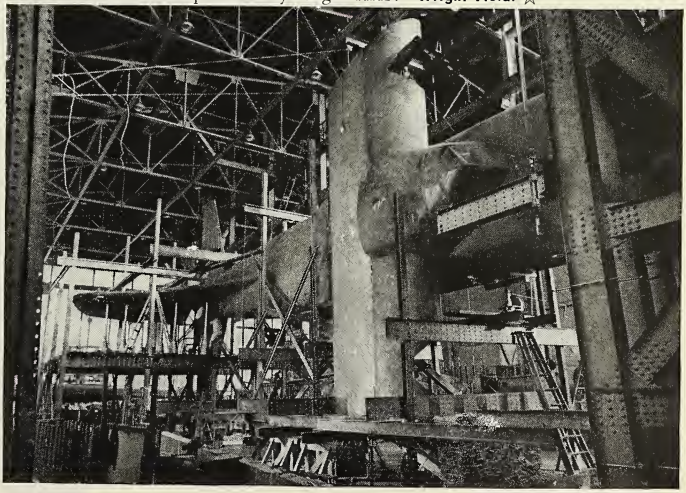
Heretofore, it was necessary for the instructor to bring the Link out of a spin when it was first started before the student could take over the controls, which meant that the student assumed control of the trainer after it was in full "flight." By the use of Technical Sergeant Holbert's invention, the student is in full control from the time the trainer is started. He can simulate taxiing on the ground and perform a complete instrument take-off.

The attachment is essentially a complex three-way valve which regulates the vacuum applied to both the spin-actuating system of the trainer and the instrument assembly. The key to the successful operation of the unit is the use of an electromagnetic latching device which locks the valve in place at the critical time.—**Public Relations Office, Moody Field.**

Progress Through Destruction

Engineers and static test workmen listen anxiously for that first crack, the first sign of weakness, as the tail of the C-76 below is piled higher and higher with bags of shot in Wright Field's Static Test Laboratory, where planes are destroyed in the interest of safety and progress in AAF aircraft. The actual breaking of the plane under the test load is preceded by long periods of mathematical calculations and careful arrangement of the plane or parts for testing.

Giant jacks and cranes hoist planes into testing positions on girder platforms. Shot bags, lead bars, or sand bags are used to simulate actual load conditions of the aircraft in flight. Only after such planes survive these tests, among others, are they adopted for general use by the AAF.—**Wright Field.** ☆



YOUR FRIEND ATC AIRWAYS TRAFFIC CONTROL

By Lieut. Colonel George C. Price
CHIEF OF STAFF, FLIGHT CONTROL COMMAND

IN the sky over America there is a network of airways that will lead the pilot safely "on course" through soupy darkness to almost any destination he may choose. Proprietor of the network is the Civil Aeronautics Administration which operates and maintains the more than 330 range stations, radio aids, light beacons, and emergency fields and the 23 Airways Traffic Control Centers necessary to the smooth functioning of the system.

Although the Airways were a creation of pilots, by pilots and for pilots, there are many who fly these skyways for months and even years without a clear understanding of the Airways Traffic Control organization and how it works.

Here is a play by play description of some of the facts every pilot must keep in mind as he proceeds on an airways flight.

Suppose you are about to take off from Chicago for Patterson Field, Ohio. You've checked the weather, the notices to airmen, and completed Form 23. Your Form 23 specifies a flight along the airways on contact flight rules and you know that your flight plan has been sent to the Chicago Airways Traffic Control Center for transmission to your destination.

It is important for you to know also that this flight will not be posted on the flight progress boards in the Control Center. The Center pays no attention to CFR flights unless bad weather or other trouble develops in your line of flight. You are flying contact and whether on or off the airways you are expected to fly at the proper altitudes for your heading and keep your eyes peeled for traffic en route.

You take off from Chicago in weather that looks good, meanwhile wondering a little about a front that the weather officer warned you about. Sure enough, the front starts muddying the atmosphere across your line of flight as you proceed toward Goshen, Indiana, and you wish you had filed an instrument flight plan while you were still in Chicago.

The weather won't let you proceed CFR. What can you do now? You can turn around and go back, land at the nearest airport with suitable minimums, or file an instrument flight plan. Since you are a qualified instrument pilot and want to get where you started for, you choose to request an instrument flight clearance.

You tune in on the Goshen Radio Range ahead, well in advance of your arrival over that point. You don't wait until you are over or past the range because radio conversations take time and you don't want to be past the station and out of radio touch with it before your conversation is completed.

What every pilot should know about America's protective flight network.

Goshen Radio jots down your request for an instrument clearance and asks you to wait. Why must you wait? Because a local range station cannot clear you for an airways flight. It serves only as a "go-between" for messages from pilot to the ATC Center and back. The only organization that can give you a clearance is the Center that has jurisdiction over the airways along which you propose to fly, in your case, the Chicago Center.

HERE'S what happens during the minute or two that elapses while you are waiting for a reply. The Goshen Range station operator calls Chicago by interphone and quickly gives the Chicago Center your instrument flight plan. This, of course, tells your position, the time, your present and proposed altitude, your cruising speed, your destination, your estimated time of arrival, etc.

It is also important that you give your proposed route of flight so there will be no mistake as to the exact set of airways you intend to fly.

What happens in the Chicago Center? With a copy of your flight plan in his hand, a traffic controller steps to the flight progress boards in the Center. Here on large boards are posted all instrument flight plans that have been cleared in the area controlled by that center. These boards carry the name of every range station in the area. Under each range station there is a strip of paper representing each airplane expected to report over that station—a strip identifying the airplane and giving all necessary information, including the flight altitude reserved for the flight and the time when your "report over" is expected.

A quick glance at the flight strips under the range station you have named in your flight plan shows the Chicago Center operator that all is clear for your flight. He calls Goshen and Goshen calls you, giving you your clearance to proceed at 5,000 feet and asking you to report north of the Fort Wayne Range for further clearance.

With a sigh of relief you begin your ascent to the 5,000 foot level with complete assurance that you won't cross propellers with other aircraft as you go up and that the 5,000 foot level is reserved for your exclusive use. On instrument flight more than at any other time pilots dislike the company of other aircraft.

All's well. You are sailing along a skyroad all your own toward Fort Wayne. Meanwhile, the Chicago Airways Traffic Control Center has teletyped your flight plan to the Cincinnati Center.

Why were you asked to report over Fort Wayne for further clearance? Because a few minutes out of Fort Wayne you reach the boundary of the Chicago Control Area and enter the Cincinnati Area. The Cincinnati Center may want to move you to a different altitude. As a matter of fact, they do. When you report over Fort Wayne Range, you are instructed to ascend to 7,000 feet five minutes south of the Fort Wayne Range Station and to report when you reach 7,000. You know immediately that the Cincinnati operator sees on his flight progress board that you are getting too close to some other aircraft at the 5,000 foot level. He's pushing you up a couple of thousand

feet to increase this distance. That operator doesn't want to answer all the questions he'd be asked if your plane and another one both tried to occupy the same space at the same time. His job is to keep you well separated and he's on the job every minute.

As soon as you reach 7,000 feet, you report this fact back to Fort Wayne Radio and are instructed to report again ten minutes out from the Patterson Range Station. Fort Wayne radio notifies the Cincinnati Center that you are at the 7,000 foot level and the Cincinnati operator stops worrying about you.

All information concerning your flight is immediately relayed to the center that has you under its control so that the Flight Progress Board will show your exact position. When a plane fails to complete a contact within a reasonable period after its estimated time over a given range station, the Airways Traffic Control Center starts worrying.

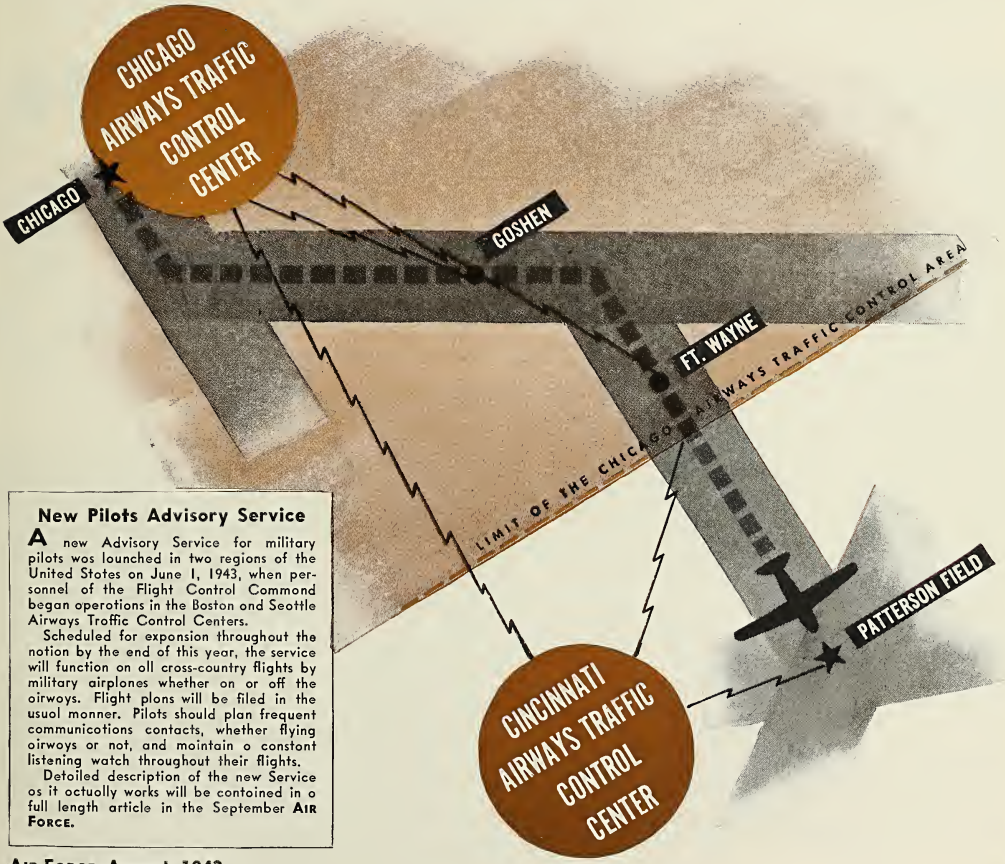
Something must be wrong with the pilot, the radio or the airplane. After a time, a general alarm will be broadcast.

You continue on your flight; ten minutes out you contact the Patterson Range Station. You are notified that ATC wants you to climb to 8,000 feet now and hold on the southeast leg of the Patterson Range. Why, you probably are asking? Because just prior to your arrival six other airplanes arrived in quick succession over the Patterson Range Station and are stacked up at successive 1,000 foot altitudes starting at 2,000 feet. ATC is putting you up on top to wait your turn to come down. As the plane at 2,000 feet is cleared to the Patterson Field tower to land, the planes above are given instructions in succession to descend 1,000 feet. Thus one by one each plane is lowered through the pattern and brought safely into Patterson Field. Your trip on an instrument flight plan from Goshen to Patterson Field is safely completed.

In the Cincinnati Center the picture of the stackup over Patterson Range was clearly shown on the flight progress board. Each change of altitude is noted for each plane on its individual flight progress strip. ATC knows a lot more about what's going on around you than you do. As each aircraft lands, Patterson Field notifies Cincinnati ATC, which teletypes or interphones the arrival message back to pilot's point of departure.

This streamlined, expertly operated system of Airways Traffic Control is a product of some of America's best aviation minds. Installed and operated by the Civil Aeronautics Authority, it has provided America with the finest network of skyways and navigational aids to be found any place in the world. The average controller feels the tremendous responsibility involved in maintaining safe separation of aircraft that are flying the airways in instrument conditions. The whole plan is one of service that will provide aid and security to all who use the airways.

You, as a pilot, can best do your part by planning your flights carefully, reporting faithfully, and obeying instructions to the letter. ☆



New Pilots Advisory Service

A new Advisory Service for military pilots was launched in two regions of the United States on June 1, 1943, when personnel of the Flight Control Command began operations in the Boston and Seattle Airways Traffic Control Centers.

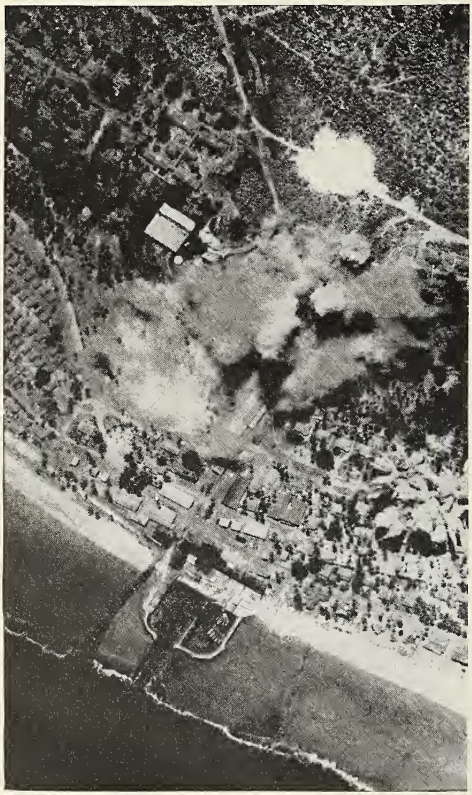
Scheduled for expansion throughout the nation by the end of this year, the service will function on all cross-country flights by military airplanes whether on or off the airways. Flight plans will be filed in the usual manner. Pilots should plan frequent communications contacts, whether flying airways or not, and maintain a constant listening watch throughout their flights.

Detailed description of the new Service as it actually works will be contained in a full length article in the September AIR FORCE.

Final Check. After their briefing, these airmen take a last minute stereoscopic squint at photographs of their assigned targets on Nauru.

Crating Eggs. These 1000-pounders were among the tons of bombs the B-24s unloaded over the enemy's island industrial center.

Fireworks. Smoke and debris (below) billow from the main phosphate plant on the island while other bombs burst in a nearby housing area.

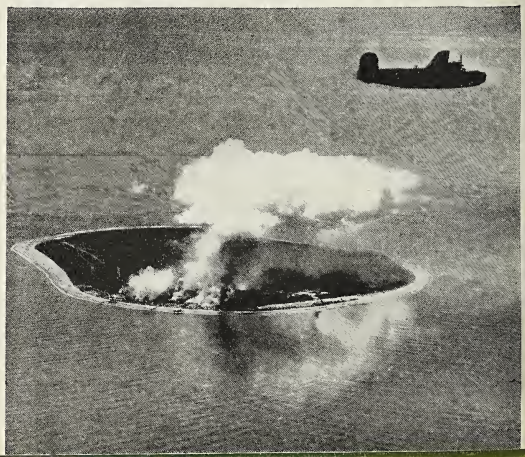


BULL'S-EYE

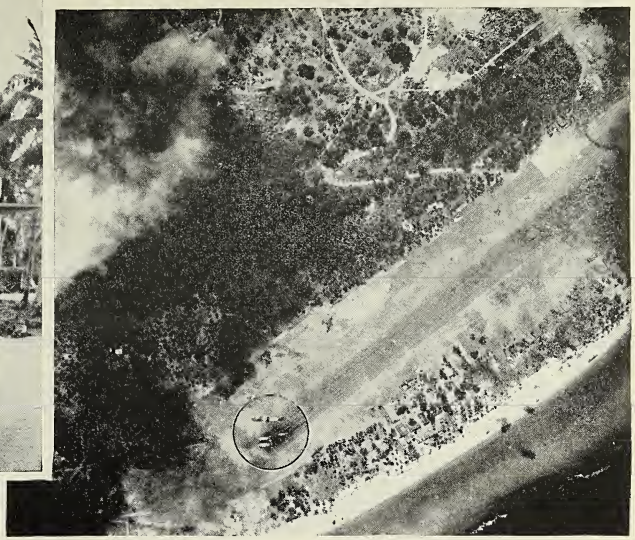
One of the most stinging blows yet delivered by American heavy bombers against the enemy in the Pacific came in mid-April when a large force of B-24s blasted the huge Jap phosphate works on the circular island of Nauru (circumference: ten miles) in the Gilbert Island group. The raid was carried out from Funafuti, largest of the Ellice Islands, which was occupied by American forces several weeks earlier. The Liberators were subjected to intense anti-aircraft fire and fighter opposition but they made their bombing runs "down the groove" and returned safely to their base. From five to seven attacking Zeros were shot down.

The Japs retaliated the following day with a raid on Funafuti, but the damage and casualties were small compared to the destruction on Nauru. ☆

Homeward Bound. With the plant area of Nauru Island aflame, the B-24s head for their base on Funafuti—mission successful.



ZERO MEDICINE. Armament crews see that the nose turret of a Liberator is well loaded with ammunition before the bombers take off.



FIRST LICKS. An early target was the Jap airfield to hamper fighter interception. Note burning planes.

BOMBING

HERE'S HOW. Crew members relax around the intelligence officer to report just how it was done.

SHOW'S OVER. Ground crews stand by to count the returning bombers, as the first of the raiders settled to the runway on Funafuti.

What's your AIR FORCE I.Q.?

A Colonel we know scored 85 points in this month's AIR FORCE Quiz, which puts him near the head of the class. Credit yourself 5 points for each correct answer and see if you ring the bell with a perfect 100; make a near miss with 90; rock the target with 80; get a passing nod with 70 or wash out with 60 or less. Answers on Page 48.

1. *How many of the following colors appear on the American Defense ribbon?*

a. Yellow
b. Red
c. White
d. Blue

2. *A Peashooter is the name often given*

a. A .30 caliber machine gun
b. A tail gunner
c. A fighter plane
d. An armament specialist

3. *Can you fill in the missing words of the Air Corps Song*

"Off we go, into the wild blue yonder, climbing high into the sun.
Here they come ....
....
'At 'em boys, give 'er the gun—give 'er the gun."

4. *The astral hatch of an airplane is commonly used by the*

a. Navigator
b. Pilot
c. Radio man
d. Bombardier

5. *The expression, "leading an airplane" is most closely associated with*

a. Taxiing
b. Landing
c. Piloting a trainer
d. Aerial gunnery

6. *A chandelle is*

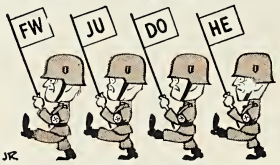
a. The right nacelle of airplane
b. The lighting system in the fuselage
c. An external bomb rack
d. A maneuver in flight

7. *Don't look now! Is the Air Corps insignia on an officer's shirt collar worn on his left or right side?*

8. *What German airplanes do the following abbreviations designate?*

(One wrong is all wrong)

a. FW
b. JU
c. DO
d. HE



9. *The angle of climb of an airplane is controlled by the*

a. Elevators
b. Ailerons
c. Rudder
d. Fin

10. *GI is the proper abbreviation for*

a. Government Inspection
b. Government Index
c. Government Installation
d. Government Issue

11. *Where does the accent fall on the word "materiel"?*

a. Matériel
b. Máteriel
c. Materiél
d. Materíel

12. *When halting a squad marching at quick time, on which foot should the command of execution, HALT, be given?*

a. Left foot
b. Right foot
c. Either foot

13. *There are four forces which act on an airplane in flight. Can you fill in the missing one?*

a. Weight
b. Lift
c. Thrust
d. .....

14. *Army Emergency Relief is available to*

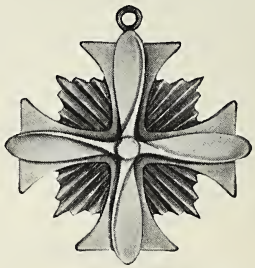
a. Officers only
b. Enlisted men only and their dependents
c. Sergeants only
d. All members of the Army and their dependents

15. *Does the stem of a Major's oak leaf insignia properly point toward or away from his neck?*

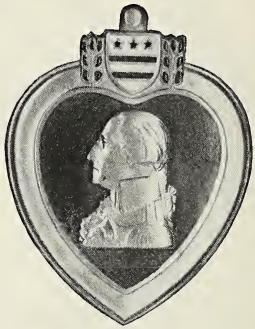
16. *3:30 p.m. regular time is the equivalent of ..... Army time?*

17. *Which is the Army Air Forces' heaviest single-engine fighter plane?*

18. *Identify this medal*



19. *Identify this medal*



20. *Is this Technical Specialist's sleeve patch for Armament, Engineering, Communications or Photography?*

How to Keep Well in the INDIAN THEATRE

Brigadier General David N. W. Grant
THE AIR SURGEON

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

The following is another in a series of articles on health conditions in the various theatres of operations.—THE EDITOR.

INDIA is a strange and colorful land. The customs, dress, language, religious beliefs and mode of life bear little resemblance to anything American. Although in the European section of some of India's larger cities and in the homes of the more wealthy Indians, conditions may resemble those in the United States, constant care should be exercised to avoid exposure to health hazards.

The native quarters of town and rural districts in India are very much as they were hundreds of years ago. There are no safe public water works, sewage is disposed of by the easiest and most convenient means, and foods are rarely inspected to make sure that they are safe.

Over one-fifth the world's population lives in India, an area a little more than one-half the size of the United States.

Practically every disease known to man occurs in this country. Because the uninformed is always likely to meet with trouble, the recognition of the dangers that exist in India is of utmost importance to American troops. Modern military medicine, especially military hygiene and sanitation, has been developed to protect the soldier, no matter what conditions he may be forced to face. If the individual soldier knows what to expect, has a fundamental knowledge of how to take care of himself, and practices ordinary cleanliness and common sense he is able to maintain his efficiency as a fighting man and avoid becoming a casualty due to disease.

Although disease conditions vary somewhat in different parts of India, malaria, "dysentery," the fungus diseases, venereal diseases and snake bite present grave military medical problems throughout the country.

A conservative estimate has been made that 1,000,000 of the 389,000,000 Indians die of malaria alone each year. This staggering figure indicates its great importance in medical considerations. While the disease is most commonly contracted in the lowlands, where frequently 100 percent of the people have malaria, it is not infrequently encountered in the hill districts.

Every precaution must be taken to avoid this disease because troops suffering from malaria can not be effective as a fighting force. Each man should have a thorough knowledge of the methods of protection against mosquitoes, not only from the malarial type but from all others, for dengue and filariasis, both mosquito-borne diseases, also occur in India. Since it is impossible for anyone other than a trained Medical Department officer to differentiate between disease-carrying mosquitoes and the purely pestiferous types, they should all be considered dangerous.

Although the malaria mosquito usually bites at night, it may be encountered during the day in dense jungles or shaded mountain valleys. When it is necessary to go out-of-doors at night or to operate in a mosquito-infested region at any time, remember to wear long-sleeved shirts buttoned to the neck, long trousers tucked into boots, head nets and gloves. Each soldier should know the value of his mosquito net, how to use it and how to care for it. He should consider it an essential piece of his equipment and should keep it available at all times.

In many parts of India the medical officer will recommend the suppressive or prophylactic treatment of malaria with either quinine or atabrine. This treatment does not prevent malaria in the true sense and consequently can not take the place of the external precautions. However, it does suppress the symptoms of malaria and thus allows a man to carry on until the military tactical situation permits hospitalization. When suppressive quinine or atabrine treatment is once instituted, directions must be followed explicitly or it may do more harm than good. "Dysentery" is a term used in its broadest sense when applying it to India. Actually the term intestinal disease is more appropriate, because typhoid fever and para-typhoid fever are extremely prevalent as are both amebic and bacillary dysentery. Cholera is another disease that falls in this group of intestinal diseases and commonly occurs as an epidemic, usually during the rainy season from June to October.

All of these intestinal diseases are diseases of filth. They can be transmitted by flies, through water or food, or by physical contact. They can be prevented if the usual sanitary precautions, observed by any clean individual, are carefully followed. The Indian people have little knowledge of, and even more important, less regard for modern sanitation. Garbage and human wastes are deposited in the streets, in the fields and along the banks of streams. Flies are abundant. They breed in waste and, since there is no screening, they have easy access to the kitchen. Streams are contaminated and foods are soiled. Consequently, you must always be on guard. Water should be boiled or chlorinated. Do not trust to luck, drink only water that has been treated by proper Army personnel. Be sure that the kitchens where your food is prepared and the places where you eat are free of flies.

Since treated water may not be available at times in India, every soldier operating in this area should know one or more methods of purifying water (FM 21-10). If he has no chlorine or iodine he should always remember that boiling water is one of the easiest and surest methods of purifying it.

Because the rate of exchange is favorable and wages are so low in this part of the world, Americans frequently hire native boys to cook, run their errands, do the laundry and perform other menial tasks. These boys may appear clean and

may be intelligent. However, do not trust their knowledge of sanitation and hygiene, for their customs usually are the same as their forefathers. Personally supervise everything they do until you have thoroughly trained them. See that a medical officer examines them and says that they are not infected with a communicable disease. Make certain that they wash their hands with soap and water whenever they are soiled. See that they prepare your food exactly as the Army prescribes. And above all, be sure that the supplies that they purchase for you are safe.

Native fruits and vegetables are dangerous. The safest rule is to eat only thoroughly cooked foods. Soaking fruits or vegetables in potassium permanganate solution is not satisfactory unless they are soaked for four or five hours. The very few dairy products existing in this area are not safe to eat. Raw or dried fresh water fish, crabs and crawfish, as well as the water chestnut, should not be eaten unless they are thoroughly and carefully cooked. They transmit the dangerous lung fluke.

One should never walk about barefoot in India. Fungus diseases, such as athlete's foot and dhobie itch, are very prevalent. They are seldom fatal but they can cripple a man and make him a liability to a fighting team. These diseases are easily prevented by bathing frequently and keeping as dry as possible. Dry all parts of the body thoroughly with your own towel, not with a towel that has been used by someone else. Be especially careful to dry between the toes, in the groin and under the arms. Dusting the body with powder, such as Army issue foot powder, and changing to dry clothing as often as possible are additional methods of preventing these diseases. During the "rains," even though precipitation is not continuous, the humidity makes it very difficult to stay dry. This calls for extra precautions.

Fungus diseases can be transmitted easily from one individual to another when the clothing of a man suffering from a fungus infection is washed with the clothing of others. It is best to do your own laundry or to see that mixed clothes are boiled.

Because of the difficulty in keeping dry, minor wounds such as leech and insect bites, scratches, cuts and burns which would be considered trivial at home, become easily infected. No matter how slight a wound appears to be, it should always be thoroughly cleansed and treated with an antiseptic.

The jungle country of India is inhabited by many animals and insects that may be dangerous to man. Although most of them will go to great lengths to avoid man, they may become dangerous when threatened. The buffalo and bear are perhaps the most dangerous animals to be encountered. The buffalo has been known to attack man without provocation. If large cow-like tracks are seen on the trail, move warily, try to avoid attention if a herd is sighted, and prepare to climb a tree if attack seems imminent. Curiosity may draw a tiger or elephant to a camping place so it is well to keep a fire burning all night. Animals are not likely to investigate a mosquito net closely because of the human scent and fear of a trap, adding value to this flimsy protection. Elephants show their presence by the damage done to the forest. If a clearing shows signs of these animals do not make camp, because you may be taking over a regular resting place for a herd. When shot, all animals should be regarded as dangerous until they display no further signs of life.

Several types of crocodiles are found in the Ganges system of rivers and along the east coast of India, and sharks abound along the entire coast line, so it is necessary to exercise caution when swimming in strange waters. Scorpions, spiders and centipedes are common in India. The sting of some of these pests, although practically never fatal to an adult, is extremely painful and may prove incapacitating. Ants, hornets, wasps, mites and the small stingless sweat-bee are annoying

pests. There are two types of leeches to watch out for in India, the large, dark horse leech in fresh water, and the small, red jungle leech on shrubs and jungle grass. Although leech bites are not dangerous, they frequently become infected and lead to painful chronic ulcers. A leech should not be pulled off the skin. They can be easily removed by touching them with a lighted cigarette or prodding them with a knife. The natives of this part of the world frequently remove leeches by touching them with a small sack of moist salt which they carry tied to the end of a stick.

Ticks are not uncommon especially in the jungle areas. One variety of tick carries a disease somewhat like our Rocky Mountain spotted fever, known as "Indian Tick-Typhus." When traveling through tick-infested country, tuck your trousers in your boots, and do not lie down in the grass unless absolutely necessary. Remove your clothing two or three times a day and search the body thoroughly for ticks. Never remove a tick with your bare fingers. Place a piece of paper or cloth about the tick before touching it, or remove it the same way as a leech—with a knife or a lighted cigarette.

India reputedly has more deaths from snake bite than any other country in the world. Poisonous snakes frequently live close to human habitations which they visit at night in search of food. Since on cool nights snakes like to get into warm places such as shoes and clothing, all clothing and shoes should be carefully examined in the morning before getting dressed. Before getting out of bed at night turn on a flashlight to make sure that there are no snakes on the floor. Always look in cupboards, drawers and other dark places before reaching in with your hand.

If bitten by a snake, the patient should be kept quiet and medical attention obtained as quickly as possible. Do not give the patient a drink of whisky or other alcoholic beverage, and do not permit him to exert himself. Follow the procedure set forth in paragraph 128, FM 21-10. Start the treatment immediately. If the bite is on an arm or leg, apply a tourniquet just above the bite. This tourniquet can be made from a neck tie, handkerchief, bandage, piece of string or vine. A cross incision, one-half by one-half inch, should be made over each fang puncture. These cuts should be from one-quarter to one-half inch deep. Suction should then be applied for at least 30 minutes. This may be done by either sucking with the mouth or by heating a bottle and applying its mouth tightly over the wound. When the bottle cools, considerable suction will be produced. If any cracks or sores are present on the lips or inside the mouth, place a small square of rubber over the wound and suck on it to avoid having the snake's venom come in contact with the mouth.

Every type of venereal disease is present in India. Syphilis, gonorrhea and chancroid are especially prevalent. Professional prostitutes are nearly always infected with one of these diseases. The great majority of clandestine pick-ups are also likely to be carriers. The soldier who has been exposed to these diseases should go immediately to the nearest Army prophylactic station or, if one is not available, use a chemical prophylactic kit. Mechanical prophylaxis should always be used.

Leprosy is widespread in India but it is not as easily contracted as many people believe. Avoid actual physical contact with a leper and there is no danger of getting this disease.

Trachoma, a very serious disease that leads to blindness, is common in all parts of the country. This is a disease of filth, and may be avoided by refraining from rubbing the eyes with soiled fingers. It can be transmitted from one person to another by means of a common face towel. ☆

"IRON ASS" . . . was the name

By
Captain B. W. Crandell
EIGHTH AIR FORCE

THEY used to think their C.O. was a slave-driver, a hard, unyielding, unsympathetic man. "Iron-ass" was the name.

There were other descriptions, too, of this B-17 group commander during those two sweltering months back in the States when he was whipping his combat crews into shape.

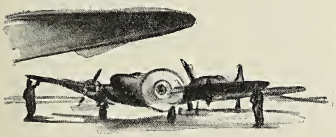
But here at a bomber station "somewhere in England" the same men call him "absolutely the best C.O. in the Army."

The story of the transition is an interesting one. It was a transition not of the C.O. but of his men.

They know him as the rare paradox of a commanding officer who almost never talks while he's working. But, when he does take a long puff on his cigar and opens his mouth, he's to the point; he has the final answer and only answer, because it has been thoroughly thought out.

This characteristic brevity, and the restrictions he slapped on them when he was desperately attempting to get them trained for combat, resulted in the "iron-ass" reputation right off the bat. They had their reasons for calling him that; he had his for being that way.

When he first took command of the Group it had four battered B-17s, a few experienced pilots, almost no experienced navigators, bombardiers, radio men or



gunners. And only two months to prepare for the "major league." The first thing was to get the airplanes and crews working on a 24-hour schedule, squeezing every minute of training time into them that was humanly possible.

They didn't like it then. It was no gentleman's way to go to war. They cursed and sweat, then cursed some more. But they flew, far into the night—bombing practice, gunnery, navigation, formations and the myriad things a group must know before tackling the Luftwaffe. Their C.O. drove them, day after day, for two months.

He kept it up when they arrived in England, restricting everyone to camp for three weeks. It was the only recourse. A mountain of work lay ahead and it had to be done immediately. British radio procedure, aids to navigation, aircraft recognition, more gunnery and bombing practice, and a hundred other necessary items.

It was his theme of "work and more work" that he promised would pay dividends. And it did.

On the first five of the Group's missions not a Fortress was lost. The Commanding Officer went on them all, taking over different positions in the crew. Once he was pilot, another time co-pilot, and on one raid he was in the top turret manning a pair of caliber fifties. He made it his job to understand the problems of each man he ordered into combat.

Among other things, he taught them a new formation. It was born in a bit of psychology.

He ordered up the Group on a training flight one day and, before the pilots knew that they were participating in an important experiment, they were obeying directions coming over the radio.

"In a little closer, Martini—stay at that height, Pyle—put your squadron higher and to the right, McGehee—get more space between elements, Preston . . ."

It went off smoothly, the C.O. reports, but adds that he doesn't think it would have been smooth if he had told them before hand that they were going to try something new and difficult.

The experiment proved that Fortresses could fly the formation, which on paper seemed to him the best defense against enemy fighters. Although he claims the formation is "nothing new—just an adaptation of the old stagger formation—" it has achieved new results for high-altitude warfare in this theatre of operations.

The Group has suffered the comparatively low loss of thirteen airplanes on 25 missions including the March 31 raid, and two of the Forts lost to enemy fighters were first forced to drop out of formation because of mechanical trouble.

Along with this tight defense, the C.O. drills the gunners to start shooting at enemy fighters, if possible, before they dive in to attack at close range. It has the same effect as a boxer's left jab. Popping away at the Focke-Wulfs and Messerschmitts while they're waiting for a break keeps them off balance.

"I don't care how few fighters you knock down," he reassures them. "Keep them away from the formation."

The Group is proud of coming home with few claims. For their C.O. continually tells them that their primary purpose in the war is to pick up a load of bombs and drop them on the target. This indoctrination has had other results, too.

The Group has had fewer "abortive" aircraft—those Fortresses which take off but return to home base without dropping their bombs. There always are good reasons for "abortives," but the men have better reasons for hitting their mark.

New adaptations of this tight, deadly formation to meet new enemy tactics, are continually changing the original pattern.

"We've got to keep a step ahead of the Luftwaffe," he says in one of his rare moments when he expresses the obvious.

Although policy now is against commanders going on all missions, he always goes when a new target, or new risks, are involved. The first raid on Germany, for instance—

(*Continued on Page 44*)

WE INTRODUCED THE JAPS TO THE B-26

By Major Dill B. Ellis

Our flight of five B-26s was on a mission to bomb a Jap airdrome at Lae. We went in at 1,500 feet, laid our bombs in the dispersal bays alongside the runway, swung out over the harbor and were suddenly jumped by fifteen or twenty Zeros.

One of our planes was badly hit and it "went in." The remaining four of us poured on all the coal we could and kept low over the water. Soon I felt my own ship, which was the lead plane, swerve heavily. The pilot of a plane behind me radioed that my right wing was afire. A 20 mm cannon shell had put a hole in the wing that you could have stuck a boot through. But we were still flying and the flame in the gas tank soon went out.

Just then our navigator, Lieutenant Leon Kallina, tapped me on the shoulder. I presume he was going to tell me about that right wing. Before he could speak he fell and I sent Lieutenant B. B. Moore, my co-pilot, back to find out what had happened. Kallina was dead. A machine gun bullet had gone right up through his chest as he stood behind me.

By the time the co-pilot returned to his seat, a Jap fighter had attacked from the front and riddled the nose of our ship. Our bombardier, Lieutenant R. E. Falls, had been seriously hit. Falls, however, was still able to stay on his guns and he got the Jap fighter. That was a satisfaction, believe me.

Some of our other planes were also having a bad time. A ship flown by Captain J. C. O'Donnell had probably suffered most, with one engine completely knocked out. The Japs, realizing he was crippled, swarmed around him like bees. But his tail gunner was a very cool customer named Corporal Henderson who knew a couple of tricks himself.

Henderson, pretending his guns were

"The B-26 is every inch a warplane," says this combat pilot, who tells why the Japs think so too.

jammed, openly invited a rear attack. Every time a Jap fighter accepted the invitation, Henderson would get him with a quick burst. He brought down three Zeros this way while the plane was flying along on one engine.

The Zeros chased us 100 to 125 miles down the coast before they turned back. We still had to cross the Owen Stanley Mountains to reach our base at Port Moresby and this, in itself, was a problem.

There was one short-cut but it was through a high pass in the mountain range and it seemed unlikely that O'Donnell's ship—with one engine gone—could make the altitude. On the other hand, I had a badly wounded man aboard and my gas was going fast.

I gave orders for the other three ships to stick together and fly back to Moresby by way of a low pass further along the range, while I took the short-cut.

HERE we got into more trouble. Two Zeros that had been on a raid against Moresby were using that high pass themselves and jumped my ship. As luck would have it, not a single man of our crew was on his guns at the moment. They were all in the tail, taking care of the wounded bombardier.

I didn't know this, of course, and turned right into those two Zeros. They didn't know it, either, and broke away without firing at us. We returned to Moresby without further incident and a little while later were joined by the other three crews. All our planes were badly shot up—it was a day when you thanked Heaven for self-sealers—and we had lost one ship. But we had brought down either seven or eight Zeros.

This was typical of the many active days our medium bombardment group wrote into its record of operations. This happened to be on May 28, 1942, but it was only one of the many calls we paid on Lae, Rabaul and Salamaua.

We had set out from the United States in February. Our B-26s were transported by ship part way across the Pacific and flown from there, island by island, to Australia. The group began operations in April.

We were stationed at Townsville, running most of our missions from Port Moresby. The airfield at Moresby was pretty rough in those days. The runway was made of dirt and gravel and had a slant to it. You took off downhill and landed uphill. And, since it was being pounded rather regularly by the Japs, you had to be careful of the soft spots—the places where bomb craters and shell holes had been filled in. However, it was 4,700 feet long, which gave us plenty of room and later the runway was leveled and equipped with a mat.

All our crews had had a lot of time in B-26s, particularly during the Louisiana maneuvers, and our ground men had learned how to maintain the ships under difficult circumstances in those same maneuvers. This helped enormously and was one of the reasons, I am sure, why our group had relatively low losses.

During the first eight months of our operations we flew always without fighter protection. In addition to the raids against Rabaul (although this was later abandoned as too long a mission for efficient use of medium bombers), Lae and Salamaua, our group took part in the Milne Bay and Coral Sea actions, and was very active throughout the whole Buna campaign. From the time that Jap ships unloaded troops on Papua until, months later, they were driven back across the Owen Stanley Range and finally eliminated from the whole area, we were busy attacking ships, storehouses, ground troop concentrations, the airdrome at Buna and other medium bomber targets. Sometimes we flew two missions a day.

In the course of these and other operations our group shot down more enemy aircraft than any other medium bomb group in the Army and now stands, I believe, either third or fourth among all bomb groups in this respect.

Our early success against Jap fighters was due in some measure to the fact that they had never seen B-26s before.

It's a tough ship to be introduced to, even though the planes we had were not nearly as heavily-gunned as the current model. The Japs had quite a time deciding upon the best approach.

Jap fighters experimented diligently in their attacks upon us until they found what they evidently believed was an advantageous approach, which thereafter they adhered to religiously.

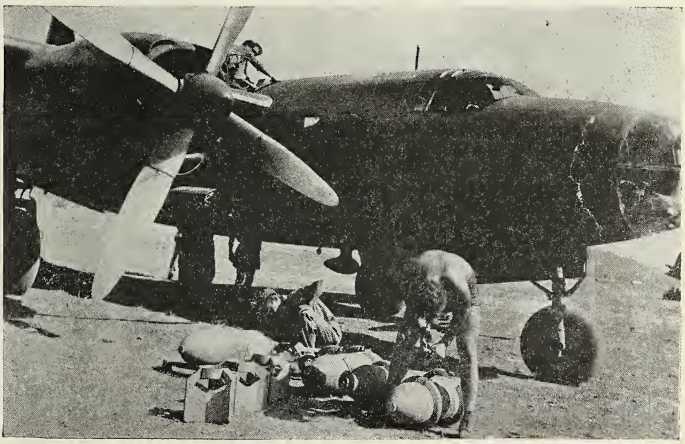
They *always* continued to show us plenty of respect, however, and with good reason.

The B-26 is every inch a warplane. It has speed, heavy armament and sturdiness.

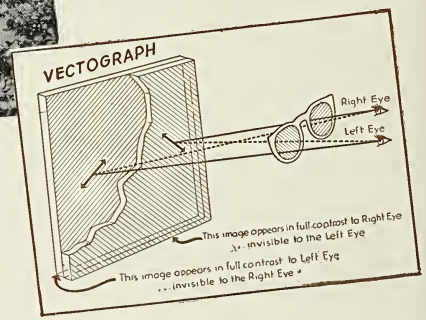
Speed, of course, is a great virtue. While in a long chase Zeros will frequently be able to make several attacks, there are many occasions when this is not the case. I remember a day when I was jumped by seven enemy fighters and they had time only to make one pass before I found cloud cover and got away. This speed—together with the fact that the plane is so maneuverable that it can be handled like a pursuit ship in many respects—is a tremendous asset in combat.

And so is the ship's strength. It will take a terrific beating and generally get you home somehow, unless you yourself are put out of commission. Even then, there's still a chance. The crew of a plane in our group once was severely shot up while attacking a Japanese ship. Both pilot and co-pilot were disabled by gun fire, one being unable to use his legs, the other unable to use his arms. By working together, however, they brought in the plane for as nice a landing as you'd ever want to see. ☆

Loading a B-26 at a Port Moresby base prior to a raid on New Guinea was a scene that was often duplicated in the author's squadron.



DEPTH PERCEPTION SIMPLIFIED



All you need out in the field to get a third-dimensional perception of a reproduction of enemy terrain is a Vectograph print and a pair of polarized spectacles. The Vectograph principle is illustrated in the figure at right. Light polarizers in the print and spectacles, crossing at right angles, give the double-image Vectograph the effect of depth.

By Lieutenant Colonel M. E. Parks

HEADQUARTERS, ARMY AIR FORCES

CREW members of a bombardment group gather in the briefing room. The briefing officer snaps out the lights and flashes a lantern slide on the screen. The slide shows a piece of enemy terrain, but it has the typical hazy appearance of a double exposure and, with the naked eye, it is somewhat difficult to identify. The men in the room then put on what appear to be ordinary dark sunglasses and the reproduction comes to life. The picture actually takes on *depth*. That tree-bordered stream snaking across the terrain shows up, not as a stream, but as flat paint disguising an enemy airfield. Strictly a camouflage job. And that patch of woods. More camouflage. The trees slope upward in tell-tale humps that mean not woods at all but a couple of camouflaged hangars. Now the crew has its target.

Three-dimensional pictures of this type are now being made by Air Force photographic units. They are called Vectographs. Aside from their double image appearance without the glasses, they look and handle much like ordinary photographs and are just about as convenient to use. As projection slides they can be viewed by an entire group with the aid of only simple Polaroid Three-Dimensional Picture spectacles. Even handier, Vectographs can be made up as prints to be held in the hand, hung on the wall or mounted in book form for detailed study.

The three-dimensional picture principle is not new. In the first World War photo intelligence officers used three-dimensional methods on aerial photos to dig out information that could not be obtained from ordinary flat pictures. But the job required the use of two paper prints, a stereoscope made up of mirrors or lenses and a work table, and the employment of considerable patience and even greater skill. The stereoscope still represents the best method of obtaining quick three-dimensional views of aerial photos but expert handling remains a prerequisite.

What is new about the Vectograph is that it provides an easy way for non-experts to benefit from three-dimensional views and permits mass reproduction of such pictures for new and important uses.

THE Vectograph also affords a much larger view than the stereoscope. In addition, photo labs may piece together any number of these separate area views into a "model" of hundreds of square miles of territory to serve as quick substitutes for maps or to show information that maps cannot present. These big Vectographs can be studied by a number of people at once, whereas the stereoscope is strictly a one-man show.

This new method is now an established service in the AAF, the Navy, Marine Corps and the RAF. Air and ground force groups in the South Pacific, the Aleutians, Africa and Britain are having them made up by photo units already trained and equipped to do the job.

The Vectograph employs a simple principle. By placing your hand over one eye and looking around, you can see that it takes two eyes to get a true three-dimensional view. For the same reason, it takes two different pictures—one for the right eye and one for the left eye of the observer—taken from two different focal points, to make a three-dimensional picture. Furthermore, your eyes have to pick up these two different images at the same time and see them as if they were in the same place. They must be shown so that the right eye sees only the right-eye image and the left eye only the left-eye image, while the brain fuses the two into a single three-dimensional picture.

With the Vectograph, the two images required for the three-dimensional picture occupy the same piece of the special Vectograph sheet, one image right over the other, without interfering with each other when viewed through polarizing spectacles.

This can be accomplished because the Vectograph image is rendered in terms of "degree of polarization" rather than in pigment, dye or silver particles.

The scope of photo interpretation has been broadened by this new third-dimensional technique

The Vectograph sheet has two sides, both actively engaged in the job. The printing solution converts the film surfaces into light polarizers, which behave as if they were made of optical slots. Light is blocked by a pair of polarizers whose slots cross at right angles with resultant blackness. On the other hand, light is passed most easily by a pair of polarizers with parallel slots. As a polarizer, each face of the Vectograph film acts as a set of optical slots. The viewing spectacles contain polarizing eyepieces. In combination, the spectacles and the polarizing Vectograph images create and control the pattern of blacks, whites and grays which the eyes see. To separate the pictures, one for each eye, the optical slots of the two Vectograph polarizing images cross at right angles; the lenses of the viewers are similarly arranged. Each eye is matched up with its corresponding image.

Without the glasses, the Vectograph print, held in your hand or projected on a screen, looks like a fuzzy double-exposure. With them, the two images on the sheet are unscrambled so that each eye gets its own perfect image to look at and combine with the other into the single depth view.

Pictures of machinery, guns and other training subjects may be made with a special double camera taking the two views at once, or a regular camera, such as the Speed Graphic, taking one picture from one point and moving sideways a few inches before snapping the other.

The Vectograph with its polarizer principle was invented by Edwin H. Land, president and director of research of Polaroid Corporation, working with Joseph Mahler, a specialist in methods of three-dimensional presentation. The process was announced late in 1939 and quickly developed into practical form for war use with the encouragement of the AAF and other branches of the service.

A first-quality clothes wringer is the most elaborate piece of special equipment used in making Vectographs.

The process starts with a pair of stereoscopic negatives obtained by any of the usual methods. Here aerial photography has a great advantage over visual observation. A pair of photographs made with standard sixty percent overlap gives the effect of spreading the eyes as far as the camera stations are apart, greatly heightening the scale of relief. Terrain that looks perfectly flat to an aerial observer appears in full relief in the Vectograph.

ANY of the standard aerial cameras can be used, and there is no special trick in taking the pictures. The aerial photographer simply follows the regular rules for making reconnaissance strips.

He prints the negatives photographically on Eastman Washoff Relief Film, the same film used for making color prints, and then soaks them briefly in a special printing solution, inserts the Vectograph sheet and runs the sandwich through the wringer. The images begin to appear and, in less than a minute, they are complete. He next strips off the relief films from the Vectograph and sets them to soak for the next print. (The process is detailed in T.O. 10-25-23.)

Selected AAF photographers take only a week's post-graduate course to add Vectography to their regular bag of tricks.

After two practice runs through the process, they are usually able to start with a pair of negatives and turn out a print, dried and trimmed, in about thirty minutes. Succeeding copies take about one man-minute apiece. The process can be carried out in any place that can be darkened—the Air Force standard trailer, a blacked-out truck body, any base or field photographic unit. Service personnel already have been turning out Vectographs of satisfactory quality under field conditions in the combat theatre.

Although new uses for Vectographs will arise from time to time, their principal military value may be summed up as follows:

Briefing combat teams, such as bomber crews, assault parties, landmining groups, engineers, air support groups, ship-to-shore artillery units and parachute troops.

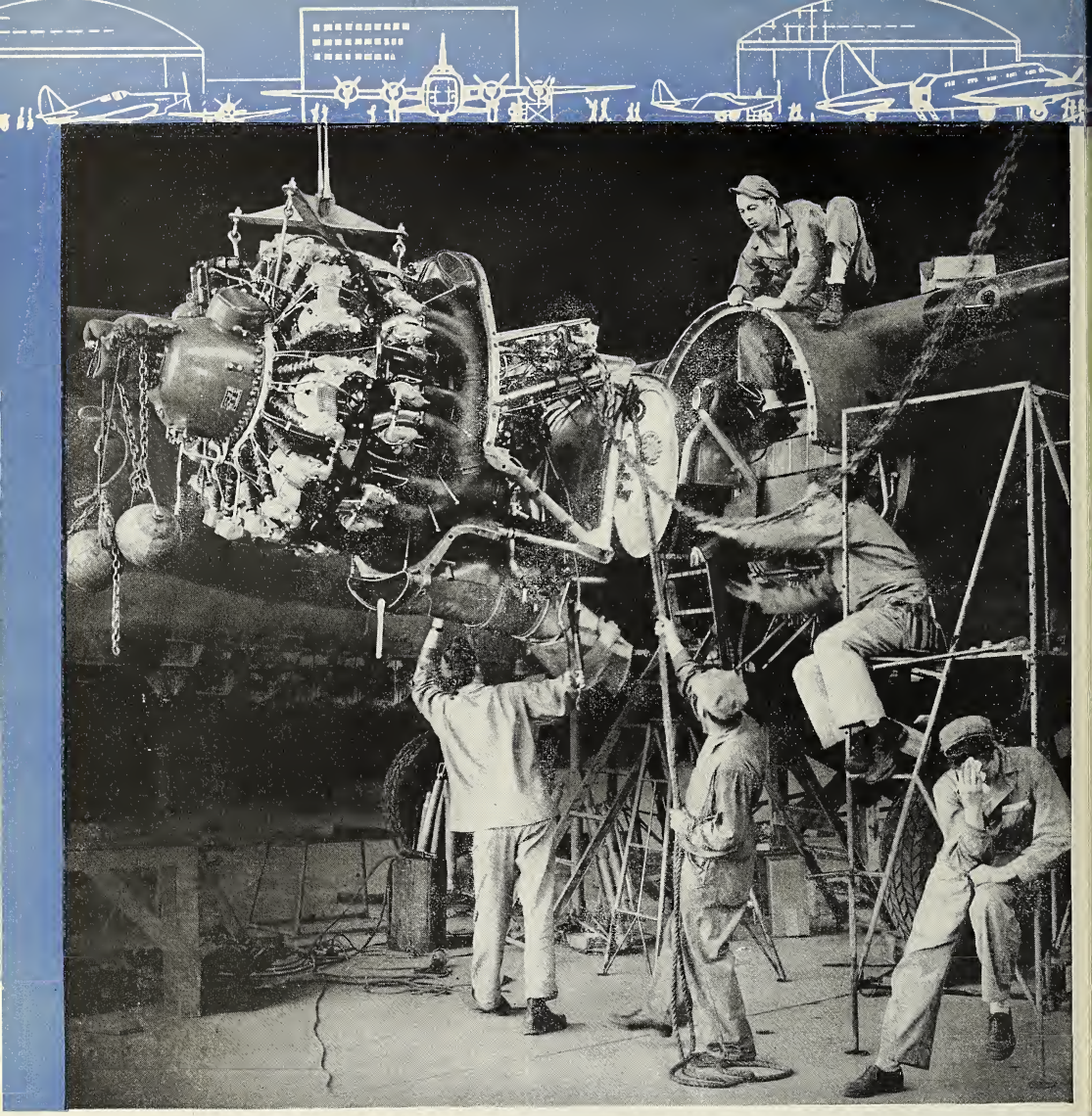
Staff work—for tactical planning over unmapped or sketchily-mapped territory.

Intelligence reports—for conveying intelligence information to field officers who need not be equipped with stereoscopes in order to be thoroughly familiar with the location and appearance of enemy supply depots, dumps, road crossings, bridges, communication bottlenecks, fortifications, the effects of bombing and shellfire, disposition of enemy artillery and desirable target objectives.

Training large classes of student mechanics, gunners, navigators, pilots and other personnel who must assimilate a lot of information rapidly on subjects and devices that are difficult to understand from a flat picture. ☆

Here's how a Vectograph slide of a target area may be viewed through third-dimensional glasses by a number of people at the same time.

There's only one girl in this picture. It's the Vectograph, plus a couple of mirrors, one on the right and one in front of the girl, that has you seeing double or triple or quadruple. This is a photograph of a Vectograph print, with its hazy, double-exposure appearance to the naked eye. Through the Vectograph spectacles held over the print, you will note that the legs and arms of the mirrored image at the left appear smooth and in focus, while the shoulders and face do not. Similarly, the panel back of the girl at the right shows up single in the right lens of the spectacles and double outside. You actually are seeing a different picture through each of the lenses. If you had the opportunity to look through these glasses at the Vectograph print, the combination of the two images, one seen by each eye, would produce the third-dimensional effect. And it isn't bad, either.



WHAT'S WRONG WITH THIS PICTURE?

H'M. Better ask what's right about it.

We might more appropriately use the title "How NOT To Change An Airplane Engine." Nine specific mistakes in the picture, listed on the opposite page, were pointed out for us by Private First Class Alfred Purinton, who is the mech tugging on the rope. Did he miss any?

This example of how not to change an engine was posed in the interest of better maintenance practices by men of the Air Service Command. They are members of the 88th Repair Squadron of the Fairfield, Ohio, Air Depot, Control Area Command. Left to right, they are, Private Frank De Chirico, Privates First Class Purinton, Ruben Wetherell and William Wharton; astride the nacelle is Private First Class Noah Reese.

ON THE LINE

Mistakes on Opposite Page

Reading fram left to right

1. Just notice, will you, how all those scattered tools and unnecessary equipment clutter up the mechs' working space. This greatly interferes with efficiency in maintenance procedure and creates many hazards to safety.

2. Weights on the prop shaft should not be used (unless a sling isn't available). Two weights do not hold the engine in correct position for installation, yet a third weight might distort the prop shaft. A sling is the thing. Reference: T.O. 02-10GA-2.

3. Sooner or later someone of you five mechs is going to be looking high and low for that ratchet wrench. See it? It's there in the oil cooler air scoop. Every tool in its proper place is readily located —no time ON THE LINE for a game of "hide the wrench." The same thing applies to the rod in the aperture of the leading edge of the left wing.

4. Never, never, stand under an engine. There is not written guarantee that an engine won't drop from its hoist.

5. The engine mounting bolts are in backwards, fellows. You'll find out you can't install an engine this way. Reference: T.O. 01-1-58.

6. What is this anyway, tug of war? You, pulling at the rope, you're wasting manpower. The chain attached to the engine mount is another superfluous operation. Both mistakes should be eliminated by using the sling already mentioned. Never use a heavy chain for guidance because of the danger of smashing tubing, conduit and junction boxes. Also, the chain might swing backwards and puncture the tank; more important—if it falls, it might kill a mech.

7. Hey, you up on the nacelle. You're about to commit four unpardonable boners. You're swinging foot can rupture the fluid lines. When the engine fits into place your leg will be mashed between the tank and the firewall. You might kick that block off the wing with your left foot. The fingers of both your hands are in a swell position to be smashed.

8. The maintenance stand on the right is improperly placed. It should be closer to the plane to provide safety for that mech reaching toward the engine.

9. Look out for that ratchet wrench just ready to drop off the maintenance stand. And it's right in line to fall on the head of your buddy.

P.S. You might conclude that the dejected mech with his handkerchief to his head is deploring the messy job in this picture. But it's even more serious. He's a victim of the August heat, largely because he forgets to take those salt tablets and plenty of water. But we won't count this one against you.

Taxi Accidents . . .

Many taxi accidents are caused by improper care and checking of brakes. On inspection of several airplanes that were damaged in taxi accidents recently, one was found to have an 0.110 inch clearance in the brakes. While taxiing another of the airplanes the accident officer found that the right brake failed twice during a test involving about twenty stops and turns. One failure is one too many. Brake clearances should be checked every fifty hours and the system kept free of air.

And don't forget that airplanes should not be taxied from the maintenance line. Push or tow them into the clear before starting the engines for taxiing.

Pick Ups . . .

At a southern airbase, an inspection disclosed enough nails, screws, and other assorted bits of metal lying loose on the flight line to give any salvage drive a substantial boost. Damage to tires and tubes of airplanes taxied over an improperly policed area may have dangerous after-effects. Lives of pilot and crew may be jeopardized. Would you feel your feet were safe from cuts if you walked barefoot around your apron and runways at night?

In the Cockpit . . .

Remember that placards placed in cockpits calling the pilot's attention to important information are useless unless he can *read* them. If the signs are badly defaced or deteriorated, see that they are replaced by new ones.

Check This . . .

Learn the location of the main fuel line strainers on gasoline servicing trailers. Have the proper dust cap on fuel servicing nozzles. And is data of inspections stenciled on the side of the trailer?

It Happened in San Juan . . .

Not so long ago on the tropical island of Barbuda in the Antilles, a British pilot made a forced landing. Ingenuity of three AAF men enabled him to take off again in short order.

First Lieutenant Daniel R. Kelly, Technical Sergeant George L. Hilton and Private Ralph W. Alford neared the scene of the wreck with an Army crash boat.

A monthly maintenance roundup prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

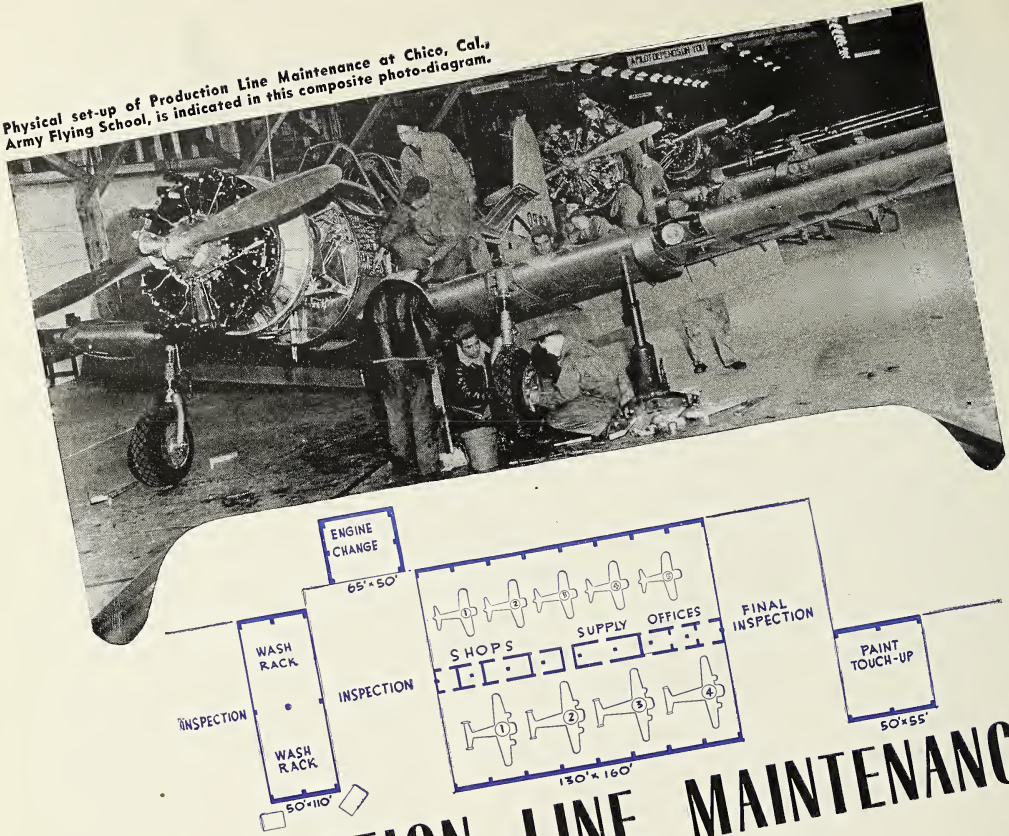
Despite bad weather they wound through dangerous reefs, followed a narrow jungle path and found the uninjured pilot.

Without facilities of a modern depot and machine shop, the men foraged a propeller and carburetor from a small plane. They spliced front and rear struts with an oar from the crash boat, using tent pegs and screws from the boat's supply. A bent eye-bolt on the rear spar was straightened after it was heated over a small gas stove.

The job was accomplished in three days. The Britisher unhesitatingly climbed into his plane and flew it to an air base where full repairs were made. ☆

It isn't often that a sergeant pins the gold bars of a secand lieutenant and the silver wings af an AAF flying affi-cer on a newly graduated aviation cadet, but Secand Lieutenant Jahn Adams was proud to have Sergeant Harold M. Adams da the honors when he was commissianed at ceremonies at Luke Field, Arizona, Army Advanced Flying Schaal.

The reasan — Sergeant Adams is Lieutenant Adams' father, and a mech ON THE LINE in that same squadron where the Lieutenant was trained.



Physical set-up of Production Line Maintenance at Chico, Cal., Army Flying School, is indicated in this composite photo-diagram.

PRODUCTION LINE MAINTENANCE

By Lieut. Colonel Charles E. Cox

AAFWCTC, Santa Ana, California

One of the major factors in the air crew training record of the Army Air Forces has been Production Line Maintenance, originated last fall by the AAF West Coast Training Center and now being adapted for use at every basic, advanced and specialized flying school in the Flying Training Command.

PLM makes maximum use of every available technician and, at the same time, educates the new mechanic with the greatest possible speed. Its installation has invariably resulted in reduced man hours per inspection, higher percentage of airplanes in commission and, above all, better maintained equipment.

Production line maintenance is not an innovation; it's an evolution born of necessity. The accompanying administrative chart gives the organization breakdown for accomplishing all 50-hour and 100-hour inspections, utilizing the highest type specialists procurable at a post. The importance of maintenance is indicated by the contemplated creation of the position of Director of Maintenance, or at least an S-4 Officer who teams up with the Director of Training. Under him come administrative personnel, hangar chief, specialty shop crews, engine change crew, and so on. A station operating 150 airplanes will have a PLM organization approximating 150 men, one-third of whom are apprentice trainees. Trained men are procured by the assignment of detachments from all school squadrons to accomplish the organization total.

Airplanes up for 50-hour or 100-hour inspection are delivered to the uncowl apron by the school squadron. Primary inspection for such apparent faults as oil leaks is made as the uncowl crew removes cowling, inspection plates and batteries, drains oil pump and cleans strainers. These parts and the airplane then move forward to the rack where the wash crew takes over. Fifteen minutes on the wash rack and the plane moves on to inspection. Cowling goes into a portable dolly which rolls to sheet metal shop for repair. Inspectors fill out worksheets, itemizing operations in addition to normal inspections found and reported by the school squadron. On 100-hour inspections the radio crew removes the set and the equipment goes to the radio shop.

The chart gives the organization breakdown from this point forward. The work stations are each manned by one staff sergeant, one sergeant, one corporal, one private first class and four students.

From four to six stations may be designated for a given job. Completion of work at Station 1 is followed by the manual movement of the airplane to Station 2 and so on to 3, 4 and 5. Each

Streamlining the aircraft maintenance program in the AAF to reduce inspection man hours, speed the education of new mechanics and keep a greater percentage of planes in the air.

station records the time required to complete each operation. Specialty shops and engine change have crews comparable to the respective stations, although a variable is encountered here in that propellers and welding (brackets, minor work, etc.) do not require the same number of specialists as radio and sheet metal. Students are also assigned to the specialty shops. Most of them are recruits having had civil experience in such work. At the last station, the airplane receives the final check, followed by base technical inspection. Pre-flight check and return to flying status follow.

Some advanced flying schools use a three-shift operation. Basic schools accomplish night maintenance with a combination double and staggered shift. Airplanes are received for inspection at 1730 o'clock. The first shift, all but station work crews, is on from 1700 until 0030 o'clock, and the second shift from 0015 until 0800 o'clock, or completion of work. This permits an overlap at midnight and a welcome hot meal.

Work-station crews report successively at 1800, 1900, 2000 o'clock and so on, and remain until their work is accomplished. Since planes are not available until the end of the day's flying and since they require time to wash and move through the line, the reason for staggering of hours is obvious. One swing shift per line, capable of accomplishing any work, is always available to permit one 24-hour pass per week for each man. If final inspection should determine that the wheel and brake crew, released from duty prior to the final inspection, has failed in any particular, this crew is returned to the hangar to accomplish the correction. No stoppage of the production line is permitted by the need for sub-depot work or lack of parts. No specialty shop tasks are undertaken that slow the line.

Supply becomes the master issuing agency and reduces squadron technical supply to a bare minimum. Supply personnel are on duty 24 hours a day to stock up during the day and to issue at night when PLM is in active operation.

Students and one experienced man move from station to station weekly and are graded by the station leader. These grades accompany the trainees upon his return to his squadron. During inclement weather, additional training is given by assigning trainees to read technical orders under the guidance of an experienced man. The operation demands complete cooperation among school squadrons, sub-depot and the PLM organization. Sub-depot commanders recognize that the system will relieve them of small odd jobs, permitting full effort on T.O. compliance, accident repair and depot inspection repairs. Personnel on PLM must be relieved from special duty during work hours.

There must be cooperation on promotions. Weekly meetings between squadron officers and PLM officers are held to review engineering standards and division of work.

Importance of school squadrons is not reduced by installation of this system. They concentrate on daily and 25-hour inspections, clean canopies and cockpits, and do all the miscellaneous tasks that make up efficient service to the pilot. Furthermore, as students and trained personnel are all rotated through PLM, the activity becomes a community effort. The squadrons all participate, all profit.

Prior to PLM, airplanes at times were grounded for lack of parts when the needed item was actually in the supply section of another squadron. Under a Director of Maintenance, the cause for grounding any plane is investigated immediately. Fat and lean extremes, such as one squadron with a Kerrick cleaner and five others with none, is remedied by assignment of the cleaner to PLM, where all airplanes are washed every fifty hours. The station breakdown of work is continually subject to improvement. Men with some statistical training, whether or not they have had aeronautical background, study parts exchange, movement of men and equipment, and utilization of critical tools by all shifts on the relay race principle. Their recommendations are saving plenty of time and paper work.

With reference to the physical set-up chart, the 130 by 160-foot building is a departure from the standard hangar in that it is specifically designed to *maintain* airplanes, and not just to house them. Supply, shops, power, light and air lines are centrally located to reduce movement. Work benches are placed along the center aisle. Lights on counterbalances are designed to fit the needs of individual work stations.

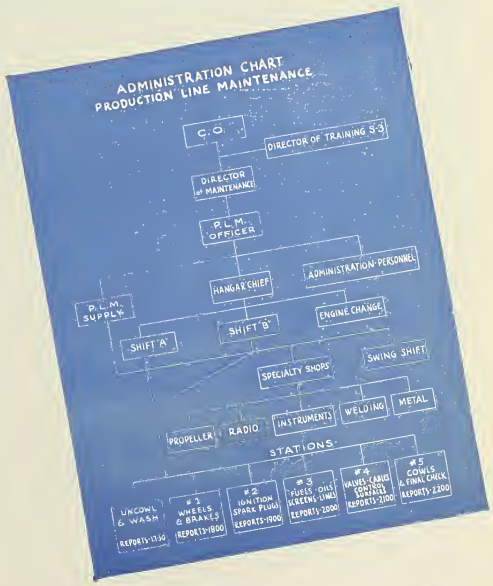
The Corps of Engineers has estimated cost of the building along at $42,000, compared to $62,000 for the smallest standard hangar, the 80-by-120-foot OBH 2. The building "fits" a unit of 150 airplanes as standard equipment, in much the same way as a tool kit and motor cover go with one plane.

Each post PLM is a production line of students. Training of maintenance and engineering personnel and the accomplishing of inspections can function on the same primary-basic-advanced basis and with the same centralized supervision as pilot training.

Excerpts taken at random from stations' reports on production maintenance best summarize the record to date:

"Trains better mechanics in a shorter time."
"Greatly reduces inspection and engine change man hours."
"Prolongs airplane life and increases time between overhauls."
"Releases more airplanes to flying department, permitting the station to operate with fewer ships."
"Reduces number of airplanes grounded during day because of small defects."
"Anticipates parts needed in advance."
"Gives planes better appearance."
"Maintains airplanes better."

As one Director of Training put it, "It's a swell feeling to know that all our airplanes are being inspected by the best men we've got." ☆



CARGO FROM THE SKY

By Theodore A. Berchtold

Wright Field

Cargo parachutes, varying in diameter from doll-like two and one-half-foot chutes for dropping messages to giant 48-foot nylon or rayon chutes capable of dropping 3,000-pound loads, provide part of the Army's answer to the problem of supplying ground troops with equipment and materiel.

Developed in the Equipment Laboratory at Wright Field, cargo parachutes are being used by the Army Air Forces in increasing proportions in areas where dropping supplies from the skies is the quickest and most practical method of licking the supply problem.

Although the Army's parachutes vary in size, the 24-foot chute has become the most widely known because of its all-round usefulness. This parachute can drop loads up to 300 pounds and may be used for both cargo and personnel. Formerly made of cotton, this chute is now manufactured chiefly of rayon with a resultant increase in strength.

The 48-foot chutes, the Army's largest, are utilized for dropping such equipment as the heavy iron matting used for building emergency runways, land-mines, demolition equipment, mortars and other heavy war materiel. These chutes are released by the Army's heavy bombers.

A 12-foot parachute for dropping sea-rescue kits is one of the latest types developed by the Army. This chute is used to drop supplies to crash survivors at sea until such time as planes can be dispatched to rescue the men.

To enable ground troops to identify the parachutes when they land, variously colored canopies are used, each color representing a certain kind of cargo or equipment item. A parachute with a red canopy, for example, might indicate that a machine gun will be found inside the delivery container; a green chute might identify its load as a piece of demolition equipment, and so on. Just to keep the

Parachutes for everything from a bottle of medicine to steel runway matting are providing a big answer to the supply problem in this war

enemy guessing in case it discovers what the color combinations mean, the combinations are changed from time to time.

Although cargo parachutes have only recently been brought to wide public attention, their origin is not a development of the current war. They were first used by the French in 1918 when French flyers dropped supplies to troops along the Belgian border. Since this development occurred during the closing days of World War I, little more was done in the development until the present war when military experts again saw the possibilities of using parachutes for cargo purposes.

To the parachute research experts at Wright Field, cargo chutes, from a technical point of view, are no different than chutes used for dropping personnel. Basically, whether the parachute has attached a human being or a freight cargo is of little difference for the problem is simply one of dropping a "dead load." Obviously, safety factors are vastly more important in the one type of chute than in the other, but the theory lying behind parachutes of definite sizes to carry definite weight loads remains the same.

Aerial delivery containers, in which the dropped supplies and equipment are packed, have been standardized as the results of experiments conducted at Wright Field. There are now two general types of container. The first is a cardboard box, with fabric covering, which can be used to drop anything from bulky metal objects to delicate instruments. It is an all-purpose container. The second type is a cotton blanket roll, eighteen inches in diameter and five feet in length. Packed in this roll are such items as guns, mortars, ammunition and other materiel.

The smallest chutes—those two and one-half feet in diameter—are of great value in dropping sustenance kits, messages and other small items not exceeding one pound in weight.

So that ground forces may quickly identify parachutes dropped during night operations, special lamp assemblies resembling flashlights are attached to the aerial containers. These lamps, which have bulbs at both ends, are fitted with colored plastic caps so that the nature of cargo released can be identified easily by means of the colored lights.

Cargo parachutes have been used largely in low altitude operations to permit accuracy in dropping the supplies. A cargo chute can be released from 100 to 150 feet above the ground since it will inflate in one and a half seconds.

Research experts are now tackling the problem of high altitude dropping, but so far no satisfactory timing device has been developed to assure the loads reaching their ground destinations with accuracy. There is a vast difference in releasing a bomb at high altitude and sending a cargo parachute earthward from a similar height. To find a satisfactory solution, parachute workers are now experimenting with a number of automatic timers and they believe that in the near future chutes may be released from high altitudes with almost the accuracy of bombs.

"We're getting ideas every day from all over the country on parachute improvements," declares J. J. Maskey, chief of the parachute unit of the Equipment Laboratory at Wright Field. "The idea of using paper for parachutes is particularly popular. We have been working with paper chutes for ten years, but none of them developed to date are entirely satisfactory, due chiefly to the fact that paper has a habit of splintering."

Pneumatic parachutes are also widespread in the minds of the country's amateur scientists, largely because they involve the possibility of controlling the rate of descent. As a parachute, however, a balloon is impractical, for its bulk is excessive, to say nothing of the complications involved in the design of a suitable inflation system.

As to the ultimate weight loads that will be released by means of cargo parachutes, the answer lies in the question of how much weight the planes can carry. Parachutes can drop anything that a plane can carry and unload in flight. It will be up to the aeronautical experts of the future to provide the final answer. ☆

The A-4 delivery container consists of two general purpose cases with cargo parachute on top.

This is the type of container used to drop ammunition by means of the cargo parachute.

Fashions FOR AIR WAR

By
Private D. J. INGELLS
WRIGHT FIELD

SEVERAL weeks ago a little group of huddled figures sat in a cold, tank-like chamber at Wright Field, analyzing a galaxy of quivering dials and instruments between short gasps of oxygen. Grotesque-looking behind their goggles, oxygen masks and helmets, they were testing the Army's latest electrically-heated clothing for combat pilots, who fight in the great new battlefield eight miles above the earth where frost-bite is as dangerous as an enemy bullet.

Inside the chamber the temperature dropped to sixty degrees below zero, as cold as the coldest Arctic freezes. The men moved about, changed chairs, scribbled brief notes on little paper pads and talked with each other as though they were in a warm parlor. They played poker, dealing from the deck with gloved hands warmed by a maze of ti y wires. They ate from a tray of sandwiches with quick, choppy bites not daring to expose their lips. They drank hot cups of coffee because water froze in their cups before they could pour it.

For eight long hours they sat inside this huge ice box, which you might compare with the one in your kitchen except that it can be made five times as cold. This was the longest test of its kind on record and the new equipment proved so effective that engineers and designers now are developing the garments in quantity.

Today there are four general types of flying suits being adopted for our airmen: the electrically-heated light-weight flying suit, the multiple type suit consisting of several layers of garments piled one upon another, shearling or Alpaca lined two-piece suits, and feather-lined, quilted flotation suits. These are the best latest types and already they are proving satisfactory under flying conditions.

Each of these garments is the outgrowth of a particular problem. When machine guns began to bristle from our big bombers, it was learned that a man of normal size clothed in a heavy, bulky flying suit couldn't climb into the new ball turrets. On long flights pilots and co-pilots who had to sit in one position for long hours complained they suffered from the extreme cold. More recently, the men who fly our planes in African skies have found themselves in a peculiar position. On the ground, temperatures are reasonably moderate, yet when they climb rapidly into the sky thermometers drop sharply to sub-zero. To remedy these demanding situations something had to be done quickly. Engineers turned to the electric suit.

IN general terms the electrically-heated flying suit is a regulation pilot's combat uniform of light weight material. A series of little flexible wires inside its lining supply it with artificial heat. The principle is the same as that employed in the heated blanket which you use on cold nights. Instead of connecting into a wall socket, the pilot plugs into a circuit that gets its current from the main generator unit on a bomber or fighter. Wires are connected with a rheostat which regulates the heat as desired according to the varying altitudes.

The suit is three-piece with jacket, trousers and coveralls. The latter slips over the other clothes. Also included are electrically-heated leather gloves and light-weight felt shoes worn with a pair of wool socks. Pilots say the shoes are the most comfortable they have ever worn.

Under actual tests, such as that conducted in the cold room at Wright Field, these new suits have proven they are serviceable in temperatures as low as sixty degrees below zero. Earlier types using the same principle are worn by our pilots even now in the combat zones. But the new types are now being manufactured in considerable numbers and soon will be available. The chief advantage of the electric suit is that it retains warmth longer than the other types.

THIS solved only one problem. There were many others. Our hemisphere defense plans, long before December 7, 1941, included outlying bases which stretched from ice-capped Greenland to the warm waters of the Caribbean. Where it is coldest and the wind howls the loudest, American flyers and their ground crews have made their new homes. For more than two and a half years they have lived in the sub-zero world where the nights are six months long and almost daily the snow whips up a blizzard like the one you see once a year along Michigan Avenue in Chicago.

"We need a combination-type suit," wrote one pilot from an advanced Arctic base. "Give us something that we can wear on the ground in temperatures around zero and, at the same time, make it an outfit that we can put on with considerable comfort up in the air when it gets minus fifty degrees Fahrenheit."

Air Forces "tailors" were momentarily stumped until they hit upon a simple idea that is proving to be just what was needed—two complete uniforms, one to fit over the other when the mercury begins to drop. Around this commonsense principle, much the same as that which tells you to wear your overcoat on a cold day, the Army has created its present day combination suits for our airmen. Actually the new uniform is two layers of clothing each of which can be worn separately as a full uniform.

Under actual cold conditions, experiments have revealed that this type of uniform is warmer than the heavy wool-lined suits which are almost universally standard today. Experts point to the fact that the "dead air" between layers of clothing acts as an efficient insulator in helping to keep them warm. If you need proof try out the old axiom that several light blankets are warmer than one heavy quilt.

This multiple suit, as it is called, consists of an Alpaca fur-lined jacket, with an outer material of smooth, satin finish, which has been acclaimed for its wind resistance. (The Alpaca is a small South American animal, whose fur is being shipped to this country in large quantities under Lend-Lease.) Some jackets are lined with shearling wool or piling.

Combination multi-layer suit with two uniforms and vest fitting on top of one another.

Trousers are also lined with the same material. Both jacket and trousers have large pockets, a feature deemed essential after long study. The reasoning is based on the fact that airmen are constantly complaining they have no place to put small articles which they are required to carry with them to and from their planes.

Wearing only this inner uniform, the pilot can be comfortable in temperatures that range from thirty above to zero. It weighs only about eight or nine pounds and can be worn almost anywhere—in club room or at the base theater. However, when the temperatures run to extreme lows, another uniform is donned over this base suit.

The outer garment, consisting of jacket and trousers, leaves plenty of room for the "dead air" to circulate between the layers of clothes. Made of rough tackle cloth that is wind resistant the jacket has a large Alpaca fur collar which can be converted into a parka-type hood. Trousers held up by large suspenders serve as coveralls and are worn over the base uniform. An Alpaca fur-lined vest is also worn between the base garment and the tacklecloth outer gear where temperatures drop to extreme cold.

PRESCRIBED with the multiple type suit are rubber-soled canvas boots with a design similar to the Mukluk, which for years has been worn by the Eskimo. Experts have learned it is the warmest footwear to be worn in the Arctic. Now it is proving to be the most efficient for retaining warmth at high altitudes.

New improvements have also been made in the sheep shearling suit, worn today by most of our Air Forces personnel in the continental United States where temperatures seldom drop to extreme sub-zero levels. Briefly, the new shearling suit, consisting of jacket and trousers, is lighter and more flexible than those formerly in use. In addition, the process once used in treating the skin chemically to give it longer wear has been eliminated because it had a tendency to crack the leather and make the suits stiff.

The new shearling-lined suits will withstand temperatures down to forty or fifty degrees below zero. Their principal shortcoming is that they do not retain the heat as long as the multiple-type or electrically-heated suits. Then, too, they are rather bulky, but engineers are developing new designs to remedy this.

Latest development in new suits for our aviators is the down and "chicken feather" flotation suit. Although the down feather suits have been in use for years in Alaska, only recently have engineers turned to the chicken-feather suit now in production. Chicken feathers were found to add bouyancy to the down suit and, at the same time, preserve the warmth characteristics which had made

Network of wiring shown in lining of the suit. Note the electrically heated gloves.

it so well suited for the Arctic regions. The new model has proved especially effective for pilots who are forced to make long over-water flights.

At Wright Field one day, Captain J. R. Schenck of the Equipment Laboratory donned one of the suits and remained in water for several hours without sinking. Finally, he was pushed under but the floating qualities of the suit brought him back to the surface immediately.

The flotation suit is a two-piece garment—trousers and jacket—with a parka-type hood. The outer material is a heavy, wind-breaker, waterproofed cloth. The jacket and trousers resemble a piece of quilting, lined with chicken feathers and with a cover over it. The new types eliminate the bulky appearance of the original suits and give them flexibility.

Designing auxiliary equipment, such as helmets, gloves and boots, has always been a major problem and new developments are continuously in the works. The latest pilot's helmet is a leather, chamois-lined headgear which has built into it earphones, clamps for holding the oxygen mask and a microphone. It is designed to fit with any mask including those used by the British, Russians and Canadians. Experiments also are being made on fur caps which may be worn by flyers in the Arctic regions. These new designs are based on the old coonskin caps worn by Daniel Boone and other famous American backwoodsmen. The few which have been ordered are now being worn by pilots in combat zones under severe flying conditions. Reports indicate they may be adopted as part of a pilot's cold weather equipment. Other experiments are being conducted on a large bullet-proof combat helmet, a metal headpiece which looks like the ordinary football helmet.

GLOVES, too, have been a constant problem. Already in use are the electrically-heated gloves, the lamb-lined, one-fingered mittens of horsehide with fur lining, and the layer-type combination gloves designed on the same principle as the multiple suit.

The combination glove is the answer to frequent complaints received from mechs working in the Arctic who have been leaving pieces of skin on metal aircraft parts when they attempted to pull their fingers loose. This rayon glove, light and skin-fitting, has greatly increased the efficiency of the mechanics. Two pairs are worn for warmth.

These developments at the Equipment Laboratory at Wright Field have produced many innovations in commercial clothing as well—new type belts, zippers, parkas, scarfs, leggings, shoes and other every-day accessories which have added greatly to the working efficiency of commercial products. Many technicians in Wright laboratories hold patents on products purchased daily in the department stores of the country.

Such is the story of the Army Air Forces effort to combat the cold of the high-altitudes. It is a never ending story for tests go on night and day, hour after hour. But of more importance is the fact that these advances in clothing for the airman are helping in no small way to win the war in the skies. ☆

The canvas Mukluk and the five-pair "Arctic sock assembly" worn under boot.

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

Roll of Honor

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OAK LEAF CLUSTER TO SILVER STAR

COLONEL: Robert L. Scott, Jr. **MASTER SERGEANT:** Pete M. Vasalie. **STAFF SERGEANT:** Virgil E. De Voss.

PURPLE HEART

LIEUTENANT COLONELS: Levi C. Erdman, Jo K. Warner. **MAJORS:** Jack S. Marks (Also Air Medal), Bernard A. Schriever. **CAPTAINS:** Charles W. Dunning*, William B. Kyes, Robert D. Spitzer (With Oak Leaf Cluster and two Oak Leaf Clusters to Air Medal), Thomas B. Storey. **LIEUTENANTS:** Charles E. Bergdoll, Robert B. Bowcock, Nathan H. Corman, Nelson P. Davis, David N. Hirsch, Walter Holmes, Jr., Robert F. McMahon, Harold E. Mitts, Scott H. Neal, Carl T. Rauch, Robert M. Richey*, Meech Tahsequah, Spencer Treharne. **MASTER SERGEANT:** James R. Walter. **FIRST SERGEANTS:** James W. Carr, Herbert B. Martin*, Wallae R. Martin*. **TECHNICAL SERGEANTS:** Monroe M. Clark, Raymond E. Powell*, Charles C. Schierholz. **STAFF SERGEANTS:** Ralph Alois*, Billy O. Brandt*, John E. Cane, Edward H. Caton, Charles N. Doty, Herbert E. Fisher, George K. Gannam*, Carl R. Gross, Henry J. Humphrey*, Dennis W. Lawrence, John H. Mann*, Allen Middleton, Colon E. Neeley (Also Air Medal), Herbert Newell, Jr., Louis F. Patriquin, Curtis Q. Pyrah, Warner E. Renner. **SERGEANTS:** Delmas F. Bise, William C. Boggs, Vincent H. Bonina, Bill V. Diehl, William W. Dunnavant, James B. Ellick, Fred M. Goyan, Sidney V. Hall, Ned R. Herzstam (Also Air Medal), Jearld H. Jones, James A. MacCammond, Jr., Paul V. Moreno, Jacob T. Saba. **TECHNICIAN FOURTH GRADE:** Joseph A. Vanic. **CORPORALS:** Weldon C. Burlison*, Richard X. Chabalowski, Harold F. Graf, John J. Kohl*, Hubert D. Smith (Also Air Medal), William C. Westbrook. **PRIVATES FIRST CLASS:** Earl D. Ashley, John E. Cruthirds*, James J. McClintock*, Robert H. Mayer, Horace A. Messam*, Joseph E. Nelles*, Leroy J. Turnes. **PRIVATES:** Jerry M. Angelich*, Robert G. Brown (Also Air Medal), Joseph H. Guttman*, Edward R. Hughes, Lawrence P. Lyons*, Joseph G. Moser, William M. Northway*, Maurice J. St. Germain*, Marvin V. Wingrove.

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* Posthumous

AIR MEDAL

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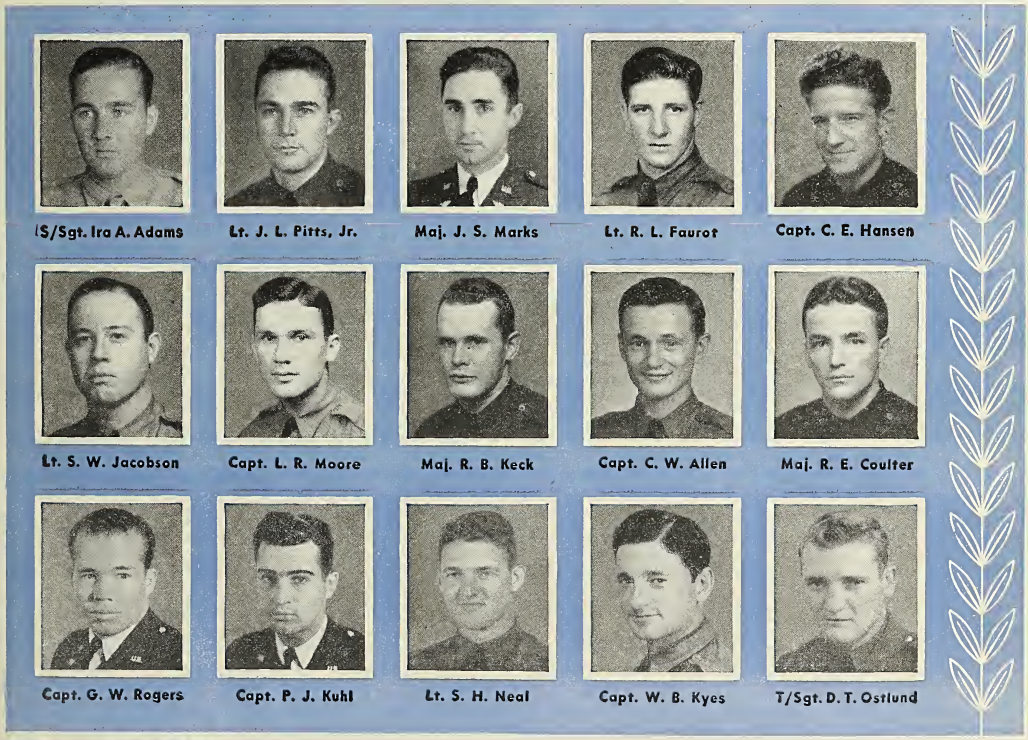
OAK LEAF CLUSTER TO AIR MEDAL

MAJOR: Richard D. Stepp. **CAPTAIN:** Kenneth D. Vandayburg. **LIEUTENANTS:** John J. Charters, William B. Drysdale, William K. Long (Three Oak Leaf Clusters). **MASTER SERGEANT:** Edwin F. Rhodes. **STAFF SERGEANTS:** Arlee F. Aten, Lawrence Holgate. **SERGEANTS:** Hugh A. Jones, Jr., Abraham Todras. **PRIVATES:** Wilbert H. Elliott, Vincent O. McMahon, Jr. ☆

* Posthumous.



bursting shells and shrapnel hitting the plane reminded me of a sudden thunder and hail storm heard from the inside of a tin shed. I managed to get the fire out of number four but number three was stubborn and burned more fiercely. I finally feathered it. Number four still was running but it was not much use. The vibration shook the whole ship. The blaze coming out of the trailing edge of the wing grew larger and larger. I knew it was burning around the gas tank and would soon cause an explosion.

About that time all hell popped loose. All our guns were blazing at seven FW-190s that had just attacked right through the flak. Suddenly a hole about two feet square appeared in the wing where number three gas tank is located and flames shot out. It must have been a hit from the bottom because the fire in number three gradually dwindled to the burning of oil. We called for the P-38s to come up and help us but the message probably never went through. Enemy fighters kept hitting us in the rear.

Harry hadn't said a word so I told the crew to put on their chutes and then go back to their guns. Just then one fighter got our instrument panel and windshields with a 20 mm. shell. It exploded right in front of Harry and for a second I thought his face was bleeding as he looked toward me. I knew I was hit too because blood was running into my eyes and oxygen mask. I jerked off my glasses and threw them to the floor. I thought my right eye had been knocked out.

The same shot had shorted the parachute bell so Fozzy bailed out.

Someone called up and said we were afire in the bomb bay, radio compartment and in the waist. I told them to fight the fire but keep an eye on the 190s. Suddenly our aileron controls went limp and the tail dropped abruptly. I knew we had

HELL OVER BIZERTE

(Continued from Page 11)

an elevator knocked off. Harry and I were shoving forward with all our might making for the clouds still below us. Though our guns were going constantly, we were almost helpless. The fighters kept coming in raking the ship from one end to the other. But the flak had stopped. At last the foggy mist of the clouds closed around us and the men were happy.

But instrument flying without instruments is no fun when you have only two engines and a rudder to help you. Somehow we came out below the clouds and were in a valley, limping on and on toward the sun.

FINALLY she quit flying. A mountain was coming up in front, we were losing altitude and we didn't know our speed. Suddenly a little patch of plowed ground came into view. I grabbed for throttles and switches and let her hit. We made it.

We all got out by various means and began looking for wounds. Most everyone had a few scratches and bruises. Harry and I were shot in the legs, arms and face. Vandergriff had a couple of holes in his arms. Everything was pretty hazy for awhile. We dressed our wounds and went to an Arab's house nearby to rest while some of the boys went for help. We didn't have to wait, however. The Arabs took us to a British Station.

Later we were able to chuckle over several incidents.

After Fozzy bailed out, Buck was going to follow, but with his broad beam and seat-pack chute he couldn't quite squeeze through the escape hatch. He tried so desperately, however, that he almost couldn't get back in. I chuckled when Buck came crawling out of the nose with the seat of his breeches torn nearly out. Tapping me on the shoulder, he shouted, "You've got to land this damn thing because I'm too goddam big to get out."

Incidentally when Fozzy landed in his chute three Arabs came forward. Two wanted to take him to the Germans and one to the English. The one fortunately prevailed after Fozzy had given him his knife as a present. Fozzy learned from the British that he had landed in a "No-Man's valley—the Allies were on one ridge and the Axis on the other.

At one point Whimpy decided things were getting so hot he had better come out of the tail and put on his chute. When he got back one of his guns had been blown off and there was a gaping hole where a seat was supposed to be. Then a FW-190 came in for a tail shot. Whimpy leaned across the opening and sprayed lead from his one gun without aiming. The 190 peeled off hurriedly.

When Gowan was trying to put out the flares which had caught fire, he exhausted his five extinguishers with no apparent results. So he tossed burning flares into the empty ball turret and poured water on them. That did the trick.

When they were ordered to put on their chutes and return to gun positions the whole crew complied except Francis, who was firing so many rounds he figured if he left the gun to get the chute they would get him before he got back. One death looked as good as the other to him so he stayed and kept his turret going even after one gun had been shot away.

Vendy ran out of ammunition so he went to the backdoor and thumbed his nose at the attacking 190s. He figured this was the least he could do.

Out of the seven fighters that attacked us we know that three will never attack again. We got one, maybe two, while Fay in another ship got two.

I guess we cheated death. ☆

He was in bed with a bad cold, running a temperature, the day before the raid. But after orders came through that evening he went down to the operations room, checked the course, the navigation, the target, the approach, the aiming point and other problems in planning the mission with his assistants. He had little sleep that night, but he led his Group over Wilhelmshaven the following day.

By now, of course, the impression the men have of their commanding officer is totally different than it was several months ago. Ask any of them what they think of him and the answer invariably is the same—an inadequate attempt to describe their whole-hearted admiration and respect for a man they all say they'd follow to Hell and back, if necessary.

His terseness, at first mistaken for sourness, is now legend.

Once when he was briefing the pilots he told them they would rendezvous with

"IRON ASS"

(Continued from Page 29)

an escort of Allied fighters after attacking the primary target. When someone asked if they would get an escort if they attacked the secondary, he remarked without hesitation, "You won't," and went casually on with the briefing.

One of his officers, who apparently played football before tackling Fortresses, compares him to a football coach.

"He's just like Bierman at Minnesota," the officer explains. "He trains us in fundamentals. Keeps us going in the air, or in school, all the time. He knows his business, and we all know he knows it."

With the Group now taking part on nearly every raid on enemy-occupied Europe, the C.O. is lenient with passes to the combat crews. But when he gives them 48 hours, he doesn't mean 58, as they thought. Anyone who returns too late, without a good excuse, can be certain of going before a Summary Court, which usually does nothing more drastic than take away some of the offender's pay.

All the men recall their discovery that their C.O. understands men as well as machines. Back in the States, just before the Group departed for England, he gave them a brief lecture on their responsibilities as Americans, as visitors, and warned some of his chronic belligerents against participating in tavern brawls.

"But if you do," he added, "don't get licked."

You probably know other C.O.s like this. You might be serving under one of them right now. The C.O. you just read about is Colonel Curtis E. LeMay, a 36-year-old veteran who, among other achievements, participated in the first "Good Will" flight to South America and pioneered the North Atlantic ferry route. ☆

A Jap transport burns in Kiska harbor and three other Jap ships are marked for destruction by aerial bombardment.

UP WHERE THE SOUP BEGINS

(Continued from Page 15)

Some of the boys had some interesting experiences. Like what happened to Lieutenant David Stevens, co-pilot in a B-24.

He was on the weather run near Kiska. Instructions were to get weather reports and stay away from the big guns defending the main Jap base. The crew had to change ships just before the take-off and the plane they got out in didn't have any bombs. Lieutenant Brown, the pilot, brought the ship to within a half mile of Kiska, and Stevens, thinking he was just a little too close for comfort, sarcastically remarked, "Why the hell don't you fly right over the place?" Brown didn't need any coaxing. He made a 270 degree turn to the right and came directly over Southhead, the south point of Kiska harbor. Then he circled right back over Little Kiska at 1,800 feet. The Japs threw up everything but Tojo's false teeth but nothing happened.

During good flying weather the Japs had plenty of practice with those ack-ack guns. When the soup cleared we had to make up for lost time. Often enough it meant pushing those heavy ships along 20 feet over the water. That's almost close enough to get your feet wet. One crew ran into some fog about twenty minutes out and stayed at 20 feet for three and a half hours. They climbed to 4,000 feet to feather a prop 700 miles from their base and then flew back again at 20 feet.

Sometimes the Japs play a pretty smart game with their ack-ack guns. Lieutenant Madison went up to Attu one day and found the weather overcast at 1,200 feet. He observed the island from an offshore point of about two miles and then entered Holt Bay to inspect enemy activity there. He went directly into the harbor at 660 feet and found no opposition at all. When he turned to leave the bay after deciding that the enemy obviously was not prepared to defend it, all hell broke loose. Ack-ack bursts were all over the place. The Japs had waited patiently until he was within 500 yards before they opened fire. Nobody knows how, but he got his ship back safely.

On those missions we used to have a lot of fun listening to the Japs on the radio. They talked pretty good English and they tried to scare us away. Most of the time they hissed, "Men of Umnak, you are doomed. Lay down your arms—surrender." Sometimes they would offer misleading remarks, such as "Ret's get home" and "That ship went down." They screamed and bellowed blood curdling yells but we used to hand it right back to them. We found out that they didn't like to be called little men. So we called them little bastards and little sons-of-bitches. Our Colonel, W. O. Earickson—there was a man—holds the Aleutian title for plain and fancy cussing at the Japs. He didn't understand fear and he used to go right over the strongest Jap installations swearing a jagged blue streak and dropping a few bombs just to let them know he wasn't kidding.

In the kind of weather we were flying, the navigator was the boss. Pilotage was extremely difficult even when the visibility was decent. One day you would see a mountain right close by and the next day you wouldn't be able to find it.

Most of the flying was on instruments, but we found out that the only use for a drift meter was to hang our hats on it. All the wind judging up there is done by the visible observation of the white caps—and that can be surprisingly accurate after a little practice. The ocean swell comes in and moves out again from under the white caps, making the caps move into the wind. Accurate wind velocity and direction could be determined rather easily that way.

The Aleutian theatre is probably the only place where you should not fly a tight formation. In that kind of weather, you have to split up or you'll be running into your own ships.

We happened to be flying the big ships, but our fighter squadrons—38s, 39s, and 40s—really did a terriffic job. At first the Japs relied upon their float type Zeros, but our fighters polished them off so neatly that the Nips had to depend almost exclusively on ack-ack. But that didn't stop the peashooters. Those 39s used to go in and actually drive the ack-ack guns right out of their mounts—and we don't think they did the Jap gun crews much good either.

The Japs built hangars for their planes but the 38s with bombs on their wings knocked off the hangars as fast as the Japs built them. They also constructed a submarine base and Captain Brickeet must have considered that a personal affront. He came buzzing along with a couple of bombs and bingo!—no sub base. It got so bad for the Nips that they began using beached boats as supply depots. That fooled us for a while until one of the boys got curious. He dropped a few on one of the boats and it burned for six hours.

One day over Adak two P-38s jumped on a big Jap plane. He got smart and ducked into the clouds. So one 38 went above the cloud and one dropped beneath it. They just hung around waiting for the Jap to come out, and two seconds later he joined his honorable ancestors.

Everybody up there did a bang-up job but our mechanics had the toughest deal and the stuff they did is unbelievable. Despite the weather, they worked right out in the open. One time they dismantled a complete B-24 engine looking for a good piston to put on another ship. Try that when the mercury is dropping out of the bottom of the thermometer. Another time, a 38 came in for a landing, ground looped, and cut the tail right off of a 24 from just behind the waist gunner's window. The mechs took a tail off another wrecked 24 and attached it to this ship. The job took a month but that plane got back into the air.

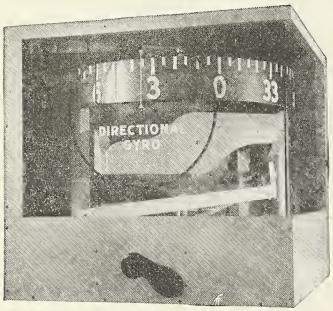
That's how it goes.

It takes longer and it's harder work, but we get things done up there. And it means more that way. Just the same, if you get the Aleutian assignment spit into the wind once for us. ☆

SYNTHETIC DEVICES

THE number and scope of synthetic devices in use by Army Air Forces training activities are continually increasing. Commercial manufacturers, as well as experimental engineers in Allied military services, are working overtime to develop these gadgets which result in valuable short cuts and in the saving of critical materials and equipment in wartime air training.

The four devices shown on this page are typical of the many included in the synthetic training devices catalog distributed by the AAF Training Aids Division to the headquarters of Commands and training Air Forces. In addition, AFTAD maintains a display room of these devices at its headquarters, Park Avenue and 32nd Street, New York City. Brief descriptions of selected devices will appear from time to time in the Training Aids section of AIR FORCE.



Directional Gyro Mock-up

WITH the introduction of the giant directional gyro mock-up, one of the most troublesome problems of classroom instruction has been solved. Large groups of students can see the workings of the mechanism without difficulty as the instructor proceeds with his explanation.

The gyro mock-ups range in size up to 24-inch cubes. Many of them are built in cutaways so the internal mechanism can be shown. They are of commercial manufacture.

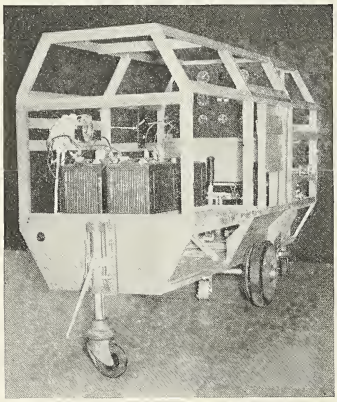
Most of the other airplane instruments are being similarly duplicated.

Bendix Navigation Trainer, Type E-1

THE illustration shows the Bendix Navigation Trainer, Type E-1, with the cowling removed.

Actually, it is a mock-up cockpit with all necessary instruments, mounted in a cart which moves slowly over the floor. Equipment is provided to permit practice and instruction in dead-reckoning, radio direction-finding and homing. A chalk mark on the floor indicates the path to be taken by the cart.

The cockpit is entirely closed and the pilot flies blind. The stick and rudder controls simulate those of an airplane.



Visual Quizzer

THE spirit of competition is injected into training with the visual quizzer, a gadget which shoots rapid-fire questions on everything from naval vessel identification to celestial navigation.

It is a compact portable unit, complete with projector, screen, scoring pads and films.

Film frames with illustrations and multiple-choice questions are flashed on the screen at automatically-timed intervals. The student inserts the number of his choice on the score pad. After a series of about eighteen questions, a frame appears with the correct answers.

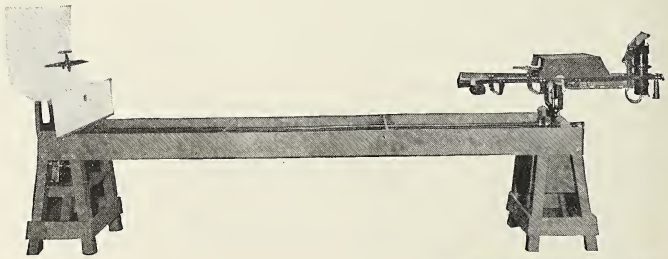
Student interest is maintained because it is a race against time. The frame changes every few seconds. There is no backing up, no second guesses.

Fixed Gunnery Deflection Trainer, 3-B-6.

THIS device is composed of a long stand with the target at one end and a reflector sight and spotlight at the other.

The target is a standard airplane model supported in front of a background of clouds. The plane may be adjusted to any altitude and the control operated to indicate any desired speed.

The student aims, allows for radii lead and fires. The spotlight shows where his bullets would have gone if it had been the real thing. If his aim is correct, the light registers a hit. Bursts fired and hits scored are registered automatically on a scoring device.



Revisions and Changes

In accordance with the radiotelephone procedure as approved by the Combined Communications Board, the following War Department Field and Technical Manuals have been revised or changed and are being distributed (dates shown indicate latest editions):

FM 24-5, Signal Cammunicatian. Changes have been prepared ta revise thase partians af the manual that have been affected by new pracedures.

FM 24-6, printed as Radia Operatars Manual, Army Graund Farces. April 12, 1943.

FM 24-8, Combined Teletypewriter (Teleprinter) Pracedure. New manual.

FM 24-10, printed as Cambined Radiatelegraph (W/T) Pracedure. January 20, 1943.

FM 24-11, Cambined Operating Signals. January 17, 1943.

FM 24-12, Army Extract af Combined Operating Signals. April 5, 1943.

TM 1-460, revised as Radiatelephane Procedure far AAF.

TM 11-454, printed as The Radia Operator. Discusses pracedure only.

TM 11-459, printed as Instructians far Learning Internatianal Marse Characters. This manual cavers the instructian in Internatianal Marse characters, which previausly was included in TM 11-454. April 21, 1942.

Want to Stay Alive?

If you are going overseas, you would do well to study carefully, and if possible carry with you, copies of these pocket-size publications:

Survival, by the Airlines War Training Institute.

Arctic Emergencies, by the Flight Control Command.

Jungle and Desert Emergencies, also by the FCC.

These handy booklets contain valuable information on what to do and what not to do, what to wear, what to eat, and other details well worth knowing in case of a sea, desert, jungle or arctic emergency.

Equally informative on the same subjects are publications of the Arctic, Desert & Tropic Information Center, Eglin Field, Fla. Here are the titles of some of the bulletins: *Forced Landings and Desert Survival, Aircraft Maintenance in the Desert, Desert Operations, Jungle Notes, Notes on Arctic Living* and *Ocean Survival.*

Some of these publications have been widely distributed in the AAF. The importance of the subject matter cannot be emphasized too strongly.

Instrument Flying

The field of instrument flying is covered by four new, fully illustrated Technical Orders. They are:

T.O. No. 30-100A-1, Instrument Flying, Basic Theory and Practice.

T.O. No. 30-100B-1, Instrument Flying, Advanced Theory and Practice.

T.O. No. 30-100C-1, Instrument Flying, Instrument Flying Trainer, Instructor's Guide.

T.O. No. 30-100D-1, Instrument Flying, Technique in Weather.

For Supply Officers

Airborne radio equipment is treated comprehensively in a handbook recently prepared by the Signal Section, Air Service Command, Patterson Field, Ohio. This publication is approved for distribution in the Air Service Command, but copies may be obtained from the ASC by interested personnel of other commands. The prime purpose of this manual is to "speed up" the training of inexperienced supply officers and help them become more familiar with the different types of equipment in the shortest period of time.

"Take-Offs"

Released for AAF distribution last month, "Take-Offs" (TF 13305) serves as a basic instructional film for flying students and provides an effective refresher lesson for advanced pilots. This new film on flying techniques covers the main points involved in executing take-offs, stressing safety factors and coordination of flight controls. Other titles in the same series to be released at an early date include "Landings" and "Elementary and Pylon Eights."

"The Squadron Communications Officer"

The specific technical duties of the squadron communications officer are described in this film (TF 1-717), which is intended principally to orient squadron communications officers who are new at their jobs. The film also points out many of the general administrative duties the communications officers may be called upon to perform.

"Pre-Flight Radio Inspection For Fighter Aircraft"

This film (TF 1-771) illustrates visual and operational checks made in the pre-flight inspection of the SCR-522 as installed in the P-47. It also points out the similarity of this procedure to inspection of the SCR-274 installed on other types of fighter aircraft.

"Airplane Engine Cooling Systems — For Pilots"

The third film of a series on airplane engine cooling systems (TF 1-758) describes for pilots the correct procedures for operating engine controls on liquid-cooled and air-cooled aircraft engines in order to insure effective cooling. Although the first part of the film is devoted to an explanation of the principles of cooling systems, the major portion deals with the various controls which affect engine temperatures and the optimum operating conditions. Two other films previously released in this series are for the engine mechanic and deal with maintenance and service of the cooling system: TF 1-756 "Airplane Engine Liquid-Cooled Systems—For the Mechanic," and TF 1-757 "Airplane Engine Air-Cooled Systems—For the Mechanic."

"Oxygen Equipment — Servicing High-Pressure Removable Cylinders"

This reel (TF 1-489) shows the procedures that must be followed in refilling high-pressure removable oxygen cylinders on aircraft. It emphasizes the care that must be observed in such operations, particularly stressing safety precautions for personnel servicing high-pressure oxygen equipment. Previously released in this same series are TF 1-488 "Oxygen Equipment—Types and Use at High Altitudes," and TF 1-487 "Oxygen Equipment—Servicing Equipment in the Airplane." ☆

considerations in their construction. Moreover, they are always located so that expansion can take place; in fact, our largest "Strips" already exceed anything existing airports can produce in runway length. From a cost standpoint, you can build over 15 adequate "Flight Strips" for the cost of a single suitable airport. The difference in maintenance costs is even more impressive. In fact, an entirely new "Flight Strip," with all necessary requirements as to width and length of runway, can be built more reasonably than an existing runway on an airport can be changed over into a makeshift landing area to accommodate modern cargo aircraft. Thus, it doesn't take too much imagination to foresee "Flight Strips," located outside cities away from fog and smoke belts, where cargo (and even passengers) can be unloaded and transported by truck and car to the centers of population.

Along established air routes "Flight Strips" would be the stepping stones or staging fields, not only as auxiliary landing areas for emergency use, but as air cargo or passenger "yards" for local deliveries. Add the possibility of glider-train transportation and you visualize a not unlikely air service of the future. Off civil air routes, "Flight Strips" could be utilized for feeder airline service.

Our third major consideration concerns "Flight Strips" and international air traffic — present and future. For while the catchword has become "freedom of the air," we might well substitute "freedom of the airports" as the key to the problem. You can have all the free air you wish, but aircraft must land and take off and for that you need landing areas.

Again, I will not attempt an overall discussion of the subject, with so much thinking left to be done about the job at hand, except to say that development of the

'FLIGHT STRIPS'

(Continued from Page 10)

"Flight Strip" program in this country under federal supervision is in direct contrast to the development of airports under local ownership. Many applications of this plan have a direct relationship to international affairs, since you may substitute international agreement for federal supervision and national ownership for local ownership.

Although the Army Air Forces assisted the Canadians in every way possible to develop the airports along the Highway, the Canadians naturally consider them Canadian airports. The Highway's "Flight Strips," on the other hand, were developed entirely under the supervision of the Army Air Forces, which selected the sites with the approval of the Canadian government and asked the U. S. Public Roads Administration to make plans and surveys in accordance with standard "Flight Strip" specifications.

Although both Americans and Canadians are stationed at the airports, each airport is under a Canadian manager. The "Flight Strips" are under the jurisdiction of the road officials who are responsible for building and maintaining the Highway.

The significant point is this: The airports, like all airports, are locally owned, and after the war can be expected to be locally controlled, in this case by the Canadian government.

"Flight Strips," by their very definition, are a part of a highway right-of-way, and are always adjacent to a public highway. Their status is the status of the Alcan Highway: Title rests with Canada because it is their land; construction, maintenance and *use* are covered by an international agreement between the governments of the United States and Canada. Thus, the "Flight Strips" adjacent to the Alcan Highway form the first chain of *international* landing areas.

After the war, "Flight Strips" in Canada, in this country, or in any part of the world, should always be a part of the same laws which govern the construction, maintenance and use of highways. If it is an international highway, as is the Alcan Highway, then "Flight Strips" become international "Flight Strips" to be utilized by mutual agreement between nations.

In this country we have developed these landing areas for aircraft through the joint efforts of Congress and the War Department, the United States Public Roads Administration of the Federal Works Agency, State legislatures and State road administrations, private industry and private organizations, and a host of individuals, principally those in the rural areas. ☆

ANSWERS TO QUIZ ON PAGE 26

1. All four colors.
2. (c) A fighter plane.
3. Zooming to meet our thunder.
4. (a) Navigator.
5. (d) Aerial Gunnery
6. (d) A maneuver in flight.
7. Left side.
8. (a) Focke-Wulf. (c) Dornier. (b) Junkers. (d) Heinkel.
9. (a) Elevators.
10. (d) Government Issue.
11. (c) Materiél.
12. (c) The command HALT is given as either foot strikes the ground.
13. (d) Drag.
14. (d) All members of the Army and their dependents.
15. Away from his neck.
16. 1530.
17. P-47.
18. Distinguished Flying Cross.
19. Purple Heart.
20. Communications.

which you will operate. Learn at least a few words of their language, words that will help you communicate your wants. Learn something about native customs.

b. Approach the natives with a friendly attitude. Don't display arms. Don't show fright. Assume that they will help you. Be patient. Get them to do things by indirect hints, such as a display of restlessness on your part. But never show anger—they won't be driven. And play fair with the natives; if you make a promise, keep it.

c. Carry things on your person that the natives will want and use them for rewards. They are a vital help. Carry trinkets, tobacco twists and razor blades. Strips of silk from your parachute will be highly prized. But don't give all your wampum away at once. Ration it carefully—you may need some later on. In many areas you can write out a chit which will bring a reward to the bearer on presentation at a missionary station or military outpost. Most natives understand the use of the chit.

BAIL OUT OVER BUNA

(Continued from Page 13)

2. Before you set out on a mission, make sure you have with you all the emergency equipment you might need. Always carry your jungle kit. Be sure to have *on your person* at least the following: matches in a waterproof container, a compass, a sturdy knife, maps of the area, sulfanilimide (preferably in powder form, for wounds that infect rapidly in the tropics), quinine (for malaria, a constant tropical hazard), halazone tablets for purifying water. You'll *need* these essentials. Wear G.I. boots or a sturdy equivalent that won't snap off if you have to bail out. Keep your shirt on, figuratively as well as literally. If you can salvage your pistol, so much the better.

3. Above all else, stay calm when you are face to face with an emergency. When you get down, sit for awhile and think things through. Prior knowledge of the terrain, the natives, and the conditions under which you are operating will prevent panic. In bail-outs, take extreme caution if you land in a tree. Many men have sustained injury coming down from trees. Of course, you're anxious to hug the earth. But play safe and come down slowly and deliberately. The ground will still be there when you get down and will feel a lot better than if you come down in a hurry on your head or back. ☆

PICTURE CREDITS

5: Royal Canadian Air Force. 7: Acme Newspictures. 14-15: Signal Corps. 16: Acme Newspictures. 26: Signal Corps. 32-33: Polaroid Corporation. 34: ASC, Patterson Field, Ohio. 38: Signal Corps. 45: Wide World. 46: J. H. Keeney & Co. Back Cover: New York Museum of Modern Art. All other photographs secured through official Army Air Forces sources.

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OFFICERS' CLUB

(DOMESTIC)

By Lieutenant William T. Lent

Colonel Bustle, Post Commandant, and his partner, Major Plato, S-3, are sweating out a spade finesse through the Supply Officer. Cautious Captain Tittle, Post Adjutant, holds the King but will probably save it, along with the C.O.'s temper.

Officers' hats on the shelf have about as much individuality as a belt of 50-caliber machine-gun bullets. Here's what happened when the Unit Personnel Officer and the Special Service Officer left the cloak room during a heated discussion of last night's G.I. stage show.

In this corner we have a few of the flying officers (witness the functional headgear), hopelessly trying to beat the one-arm bandit. The Operations Officer has been stalking the machine for half an hour and now he figures it is just about ripe. He'll probably hit the jackpot with his fourth nickel but will put it all back in.

Pity the poor Chaplain, unto whom all grief gravitates. At the moment he's stuck with the A. & R. Officer's autobiography. When they get to the Illinois-Michigan game of '23, in which his nibs scored 3 touchdowns in the last 90 seconds of play, with a cracked clavicle, the Chaplain will remember an important engagement elsewhere.

Lieutenant Lardoon, Mess Officer, is taking a busman's holiday dining at the Club. He'll wind up in the kitchen leaving a new calorie chart for an indignant chef. That's the Post Surgeon, on the left, with a carnivorous appetite and case-hardened stomach.

Major Galley, combination Public Relations Officer, S-2 Officer, Photo Officer and Group Commander, has just been called to the phone between bites of hamburger to answer the query of the local newspaper editor concerning the forthcoming visit of the Paraguayan President. The Major will return to his cold coffee and then dash madly off to the OCS board meeting.

ARE YOU GUIDING THIS U-BOAT WITH *Careless* TALK?

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

SEPTEMBER 1943

Vol. 26 No. 9

SEPTEMBER 1943

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AIR FORCE
THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

September Brier

"INSPECTION concerns every man in the Army Air Forces, from the private who pours gasoline into a plane to the general who ordered its flight." In this manner Brig. Gen. Junius W. Jones, the Air Inspector, explains the need for a medium to disseminate AAF inspection information to the field. To fill this need AIR FORCE this month inaugurates a new department, prepared by the Air Inspector's office, to bring timely tips to inspectors and inspectees. Read "Prepare for Inspection" on Page 18. It should be of interest to all personnel.

BEFORE planes can be employed against the enemy, they must have bases from which to operate. Providing forward airdromes for AAF aircraft in the North African campaign was the job of our aviation engineers. An article which Brig. Gen. S. C. Godfrey, the Air Engineer, terms "the best evidence yet presented on rapid airdrome construction for a large air force in a new theatre," has been written for AIR FORCE by Brig. Gen. D. A. Davison, Chief Engineer for the Northwest African Air Forces. It appears on Page 14.

MAYBE you won't believe it but it's true: Women are flying our combat planes. Yes, the gal pilots in the Women's Auxiliary Ferrying Squadron are now breezing from factory to airfield at the controls of fighters, medium bombers and transports, as well as trainers and liaison ships. Of course, they stick to straight flying—no didos or high altitude stuff—but they're flying them just the same. An article on the first year of the WAFS, and the women pilots' transition from the lighter planes to the combat ships appears on Page 10. Incidentally, the "Flying Jenny" on the cover is Miss Nancy E. Batson, 23-year-old Alabama ferry pilot, who joined the WAFS last October. Her aviation background: CPT at University of Alabama; pilot rating in 1940; control tower operator for Pan American in summer of 1942; instructor at Embry-Riddle School of Aviation. Personal: blonde; 5 feet, 7 inches tall; not married; not engaged. Accent: decidedly southern.

LAST DECEMBER the Air Service Command was reorganized on a business basis because the Command's activities were "more closely related to those of business management than of military operation." How the ASC functions under this reorganization—which meant principally a decentralization of authority at the same echelon—is described on Page 40 by Maj. Gen. Walter H. Frank, its commanding general.

THE EMPLOYMENT of air power in the Battle of Attu is described on Page 22 by Brig. Gen. William E. Lynd, Army Air Officer on the Staff of the Commander in Chief of the Pacific Fleet. General Lynd, who has seen extensive action in the Pacific, participating personally in many important bombing missions against the enemy, took an active part in the Attu operation.

SEVERAL months ago, the Civil Air Patrol became an auxiliary of the Army Air Forces. In addition to carrying on its coastal and border patrol duties, CAP has now been assigned to the important nation-wide AAF recruiting drive. Its 60,000 members are charged with investigating, examining and qualifying candidates to eliminate the unfit before they are certified to the cadet examining boards. The work of the CAP and its future possibilities are described in an article on Page 46 by Lieut. Col. Earle L. Johnson, the CAP's national commander.

TO A PILOT in the ATC's "special mission" group, Chungking is just a spot on the map where the weather officer owes him six bucks; Cairo, where the British nurse has promised him a date on his next visit; Melbourne, where he has to pick up last week's laundry. It's tough, serious work getting cargo to all points of the earth in record time, but these pilots laugh off their assignments as strictly routine. An article on this group appears on Page 30.

"RIDING the Messerschmitt Maytag," on Page 48, is a straight-forward account by a former cadet of how he felt about washing out in primary. The author is Private Charles M. Macko, who has been reclassified at a basic training center at Fresno, Calif., to become a student under the Army Specialist Training Program. He flunked his final check ride at Thunderbird Field, Ariz., early this year. But, he writes, "disappointed as I am, I can appreciate the Army's aim. It wants the cream of the crop to make the best pilots in the world."

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CROSS COUNTRY

A report on our combat record, and other developments of the month within the Army Air Forces.

OUR score against enemy planes for the first six months of the year stood at 3,515 of the enemy destroyed, with an additional 1,127 probably destroyed and 1,280 damaged, according to an announcement by the Commanding General. During this period 846 of our aircraft were lost in aerial combat.

Bombardment planes, meanwhile, carried out their primary mission in every theatre, dropping millions of pounds of bombs on enemy industrial plants, lines of supply and communication, and military and naval installations. Our score against enemy shipping was reported as 121 surface craft sunk, 74 probably sunk nd 315 damaged.

All in all, our aircraft flew 89,691 combat sorties in the six-month period. (A month-by-month box score of our aerial combat operations, by theatres, for the first half of 1943 is on the next page.)

Return From Combat

The Commanding General also announced that more than 9,000 officers and enlisted men of the Air Forces with combat experience had been brought back to the States to train our personnel in the actual details they will encounter overseas. General Arnold reported:

"No faculty more thoroughly equipped by long, direct, personal experience could be assembled than this group of fighting men now communicating their hard-won knowledge to their brothers in arms.

"All sick and wounded Army Air Forces personnel evacuated from the theatres of operations are sent to Army Air Forces hospitals not only for medical and surgical care but also for a full study of their cases as relating to aviation medicine. The patient is evaluated both medically and aeronautically to determine for what type of aeronautical duty he is qualified.

"These qualifications are weighed against his physical defects. Reassignment of duties may be indicated. While the physical defects are being corrected, he receives instruction in the new duties which he will undertake. Thus, no part of his training and experience is lost to the Army Air Forces."

The largest single group of our personnel returned from foreign theatres—1,024 officers and 1,654 enlisted men—has been assigned to the Second Air Force. Distribution of returned personnel to other commands was reported as follows:

First Air Force, 267 officers and 361 enlisted men; Third Air Force, 683 officers and 527 enlisted men; Fourth Air Force, 268 officers and 552 enlisted men; Air Service Command, 310 officers and 351 enlisted men; Air Transport Command, 40 officers and no enlisted men; Materiel Command, 42 officers and 10 enlisted men; Flight Control Command, 57 officers and 87 enlisted men; Proving Ground Command, 35 officers and 3 enlisted men; Antisubmarine Command, 48 officers and 109 enlisted men; Technical Training Command, 152 officers and 97 enlisted men; Troop Carrier Command, 118 officers and 55 enlisted men.

Bail-out

Strictly Platonic

There is no denying the value of the work being done at the various rest centers, but we can't help passing on the story about the fellow who had been appointed a club director by one of the welfare agencies and was being coached in his duties preparatory to being sent overseas. During one of the lectures the woman in charge held forth at some length on the needs of flyers returning from combat.

"Some of these men," she said, "will be sent back to your club for extended rest periods after having 100 or 150 grueling hours of combat duty. They will come to you in need of relaxation and recreation."

The good lady paused to let the thought sink in. "Now," she continued, "when these combat flyers come in what are you going to give them? Are you going to give them coffee and doughnuts? No, certainly not! Not when there are plenty of good de-hydrated soups."

Global War

Among the prisoners taken in North Africa was a Polish soldier who had been captured by the Russians in 1939, released by them after the German invasion of Russia to serve in the Russian army in 1940, taken prisoner by the Germans in 1941, drafted into the German army in 1942, transferred to North African duty and finally captured by American troops in Tunisia in 1943.

The AAF Training Command

The new AAF Training Command was activated July 7 to replace and combine the functions of the Technical Training Command and the Flying Training Command. Maj. Gen. Barton K. Yount, former head of the FTC, was named com-

COMBAT BOX SCORE

Following is a month-by-month box score of United States Army Air Forces combat operations in theatres of operations for the first half of 1943:

	Aerial Combat Enemy Losses In			On Ground Enemy Losses			U. S. Aircraft Losses in Aerial Combat
	Lost	Probable	Damaged	Lost	Probable	Damaged	
January							
8th AF United Kingdom	57	34	22	—	—	—	15
U. S. Units, N.W. African AF	144	63	75	31	6	—	86
9th AF Middle East	11	8	7	—	—	—	5
5th AF Australia	151	55	41	6	7	3	9
13th AF So. Pacific	34	3	1	—	—	7	7
10th AF India	—	—	—	—	—	—	—
14th AF China	8	5	—	—	—	—	1
11th AF Alaska	—	—	1	—	—	—	—
Total	405	168	147	37	13	10	123
February							
8th AF United Kingdom	72	28	12	—	—	—	18
U. S. Units, N.W. African AF	128	37	73	6	3	—	78
9th AF Middle East	8	7	1	—	—	—	3
5th AF Australia	41	21	6	5	—	—	7
13th AF So. Pacific	26	1	1	—	—	—	17
10th AF India	16	14	2	6	—	—	—
14th AF China	—	—	—	18	1	—	—
11th AF Alaska	7	—	4	—	—	—	—
Total	298	108	99	35	4	—	123
March							
8th AF United Kingdom	141	43	56	—	—	—	17
U. S. Units, N.W. African AF	143	50	86	24	10	—	46
9th AF Middle East	17	4	12	—	6	—	7
5th AF Australia	91	39	15	—	3	—	11
13th AF So. Pacific	4	—	—	—	5	—	—
10th AF India	8	4	17	1	—	—	4
14th AF China	—	—	—	—	—	—	—
11th AF Alaska	2	2	—	—	—	—	1
Total	406	142	186	25	24	—	86
April							
8th AF United Kingdom	148	43	31	—	—	—	30
U. S. Units, N.W. African AF	318	84	126	118	2	56	60
9th AF Middle East	152	28	48	1	—	—	20
5th AF Australia	70	16	8	6	—	—	17
13th AF So. Pacific	17	—	—	—	—	—	12
10th AF India	1	2	7	—	—	—	1
14th AF China	16	13	—	—	—	—	—
11th AF Alaska	—	—	—	—	—	10	—
Total	722	186	220	125	2	66	140
May							
8th AF United Kingdom	348	127	172	—	—	—	70
U. S. Units, N.W. African AF	215	51	69	76	46	37	62
9th AF Middle East	20	10	14	9	—	10	28
5th AF Australia	29	10	10	4	4	3	8
13th AF So. Pacific	3	1	1	—	—	—	7
10th AF India	9	10	11	—	—	—	9
14th AF China	58	23	2	14	10	1	—
11th AF Alaska	5	7	—	1	—	—	5
Total	687	239	279	104	60	51	189
June							
8th AF United Kingdom	325	96	157	—	—	—	83
U. S. Units, N.W. African AF	171	42	52	11	1	1	70
9th AF Middle East	40	23	8	8	—	—	2
5th AF Australia	41	4	2	3	6	—	19
13th AF So. Pacific	63	1	—	—	—	—	6
10th AF India	—	—	—	—	—	—	1
14th AF China	9	8	2	—	—	—	4
11th AF Alaska	—	—	—	—	—	—	—
Total	649	174	221	22	7	1	185
Grand Total	3167	1017	1152	348	110	128	846

manding general of the new Command with headquarters in Forth Worth, Texas. "The reorganization was effected," according to the announcement from AAF Headquarters, "to achieve maximum economy of operations, the most efficient utilization of personnel, and maximum coordination of training schedules and utilization of training facilities." In future issues, AIR FORCE will publish details of the Command's activities.

NEW PLANE INSIGNIA

Not long after the conflict opened in the Pacific, the red dot was removed from the star in the insignia of AAF planes because it was being confused with the rising run painted on Jap aircraft. As the war against the Axis moved on, it became apparent that at certain distances the white star against a blue background on our planes, the black cross superimposed on

a wider white cross on Nazi aircraft, and the Japs' red dot, all appeared in the form of a dot because all angular features take this form at great distances. In July the AAF took the lead in removing this lack of distinction by adopting a new insignia consisting of the white star on a circular field of blue, a white rectangle attached horizontally at the right and left of the circle, and a red border enclosing the entire device. Result of tests: visibility at a sixty percent greater range than the old device and the German and Jap insignia, with a distance effect of a long, narrow bar rather than a dot.

MONSTER JEEP

In the way of compliments, we thought they had thrown the book at the vehicle called the Jeep, and figured the matter would have to rest until some fresh adjectives turned up. But we feel bound to report that the enemy has outdone us.

For evidence we are going to quote you the text of an Italian order captured by our forces in North Africa. It was signed by the commanding officer of an Italian anti-tank regiment. And believe us, this is the real thing (the italics are ours).

"Subject: Enemy Jeeps.

"To: Commanders, 1,2,3 Bns.

"It is time to debunk the legend according to which 'Jeeps' seem to be considered *uncatchable monsters.*

"Some anti-Jeep actions which I have instituted recently, even with small groups of riflemen, have led to the capture of three of the vehicles in question and some prisoners.

"By these actions, I have been able to

establish that the crews of these Jeeps, when met by decisive action, make their escape or surrender without opening fire but, when not so met, open fire, inflict losses on us and make their getaway.

"You are requested to draw from the above, arguments designed to raise the morale of your units, so as to secure that, by the cooperation of everyone, we succeed in freeing the lines of communication from this *insidious weapon* of enemy attack. Every commander should give strict orders to this effect."

"Expressing Our Approval"

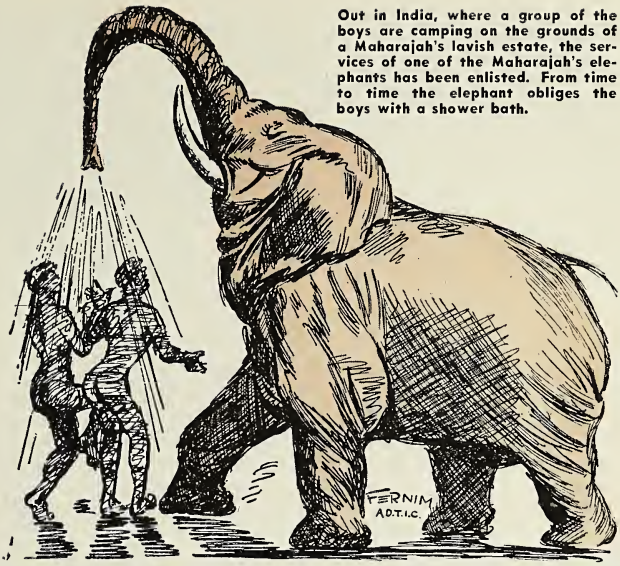
Back in the March issue we published an article by Maj. Wade R. Cunningham, Jr., Commandant of Cadets at Foster Field, Texas, entitled "What Kind of Officers Will They Make?" It was one of the best expressions we had seen of the relationship between cadets and supervising officers during advanced training.

This month we received a note from Foster Field enclosing the photostatic copy of a V-mail letter from "somewhere in North Africa." The letter was addressed to Major Cunningham and bore the signatures of nineteen officers who had received their advanced fighter pilot training at Foster before going on foreign duty. With the approval of the Foster Field CO, we're happy to reprint that letter, as follows:

"Dear Sir:

In reading the Air Force *magazine of March 1943, we are very happy to note your article entitled, 'What Kind of Officers Will They Make?' We of the class of 42J who by chance happen to be stationed here at present take this means of expressing our approval of the ideas and ideals set forth in your article. Since our graduation, November 10, we have been several places, learned considerable, and have seen lots. It is our impression that a closer relationship between cadets and their supervising officers in advanced training will pay big dividends in the future. By way of an example, the period between cadet training and the stage of flight leadership at present is so short that experience alone is not competent. Then again the value of air discipline and, at the same time, teamwork and cooperation is best obtained through a complete understanding of all concerned. Naturally this must be first learned during cadet training for the earlier this is grasped, the better type of flying officer will be produced.*

"We sincerely hope that all is well at Foster Field; for each of us has fond memories of what we consider the best, and without reservation, the most enjoyable period of our cadet training. We also wish you to convey to all that shared in our training at Foster Field the best of luck and good wishes. Then, of course, any news, items of interest or letters will be gladly received here in North Africa."



Out in India, where a group of the boys are camping on the grounds of a Maharajah's lavish estate, the services of one of the Maharajah's elephants has been enlisted. From time to time the elephant obliges the boys with a shower bath.

That First Mission

Flyers who are wondering about their first taste of combat may be interested to know that Lieut. Walter Schol, on his first combat mission, shot down a 35-year-old German veteran who had been decorated seven times. The action took place in North Africa. The German flew a ME 109G, Schol a P-40.

How're You Voting?

It is one of those arguments which probably never will be settled, but the subject is inviting and we are anxious to do our part. We refer to the question of who is the better combat fighter pilot—the Jap or the German.

Lieut. Daniel Kennedy is a P-38 pilot with a few thoughts on the subject. Kennedy has been slugging it out with the Germans for the last eight months or so, which makes him a veteran in that theatre, and has shot down five enemy planes. According to Pvt. Wade Jones, who sent in this report from North Africa, Kennedy has more than 50 missions and 190 hours combat time to his credit. This is how Kennedy feels about the Jap-German pilot question:

"I read the other day," he is quoted, "that one of our fighter pilots out in the Pacific said the Jap pilots were better than the Germans. Now I haven't been out in that theatre—yet. But it just doesn't add up with the known figures. Some of our pilots out there have twenty or so planes to their credit, I hear. I've got five and the most any man in our Group has is eight. Of course they've been at it longer, but then I'll bet we've had more encounters than they have. So if the Jap pilot is better than the German, how come so many more of them get shot down?

"Of course, I'd like to go back to the States if I can. But after that I want to go to the Pacific. Maybe I'm wrong but I bet I'd have more than five Zeros at the end of six months out there."

We were glad to get Lieutenant Kennedy's remarks and hope they will prompt further discussion. What about a line or two from the boys who have fought both the Jap and the German?

Our Apologies

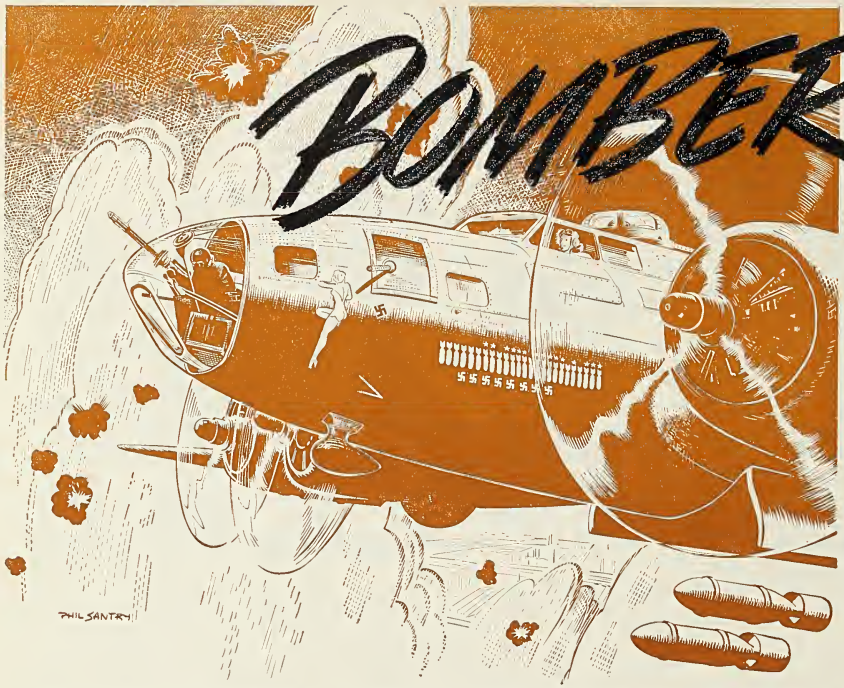
On page 3 of the July issue, we stated that the Order of Daedalians was pioneered "under the leadership of the late Brig. Gen. Harold L. George," meaning the late Brig. Gen. Harold *H.* George, fighter commander who was killed in the Southwest Pacific in the early months of the war. Maj. Gen. Harold *L.* George is the commanding general of the Air Transport Command.

The "Military Review"

We've been asked to inform you that the *Military Review*, quarterly publication of the Command and General Staff School, is now a monthly magazine. The *Review* publishes up-to-date professional military information, thought and doctrine, including translations and digests of important foreign military literature. The subscription price, $3 per year, should be remitted by check or money order with each subscription to the Book Department, Command and General Staff School, Fort Leavenworth, Kansas.

—The Editor.

BOMBERS



Bombs away — and the bombardier keeps his mind on his business despite flak and other distracting elements.

As Allied invasion forces moved in on the European fortress last month, round-the-clock bombing of continental targets by American and British aircraft based on the British Isles continued with increasing tempo.

Major responsibility for daylight bombing missions remained the every-day job of AAF four-engine bombers manned by crews of the Eighth Air Force. As the bombings increased—and more and more industrial centers and shipping points felt the blows—so increased Axis opposition. Fighter planes, the best the Nazis had to offer, and flak, often as thick as a blanket, tested the mettle of our airmen.

The Germans were trying every trick in the book—new tactical maneuvers with their fighters, air-to-air bombing, variations in flak concentrations and patterns. Our formations and tactics were constantly being changed to meet the enemy's new techniques.

Despite sterner opposition our crews and our planes are more than holding up. In a report to Headquarters, Maj. Gen. Ira C. Eaker, the Eighth's commanding general, commented:

"None of the crews has a feeling that they are overmatched. The bomber crews

A waist gunner can watch his tracers plow into an enemy fighter. This gunner already has chalked up a swastika.

The belly turret gunner thinks he has the best spot on the ship—mainly because he gets a crack at plenty of them.

From the top turret the gunner frequently gets an eyefull, too. He takes on attacking planes from many angles.

OVER EUROPE

nave a complete confidence in their ability to take a heavy toll of German fighters. It is not necessary to drive the men to their tasks, as they are enthusiastic about it.

"We employ all possible deception to avoid fighter concentration and radar detection. This is done in order to prevent interference with the bombing by enemy fighters. However, when a hot air battle results, we do not count the mission lost but consider it a victory when we destroy a large number of enemy aircraft."

As always, the primary job was the destruction of production facilities of the Axis war machine, with shooting down enemy fighters a defensive sidelight of the main task.

Coinciding with the acceleration of Allied air operations over the Continent was War Department recognition of the first anniversary of American aerial participation in the Battle of Europe. On July 4, 1942, AAF crews, manning six A-20s, got their first taste of war over the occupied Lowlands. One year later, our airmen celebrated by taking over several hundred heavy bombers to paste targets at Le Mans, Nantes and La Pallice with 544 tons of bombs. They shot down 46 German planes, scored 36 probables and damaged seven more. Eight bombers were lost.

DURING that first year, the War Department reports, B-17s and B-24s of the Eighth Air Force destroyed or damaged 102 industrial targets, naval bases and rail centers with 11,423 tons of bombs on 68 daylight precision bombing missions. They shot down 1,199 enemy planes, probably destroyed 525 more and damaged 501. We lost 276 heavy bombers.

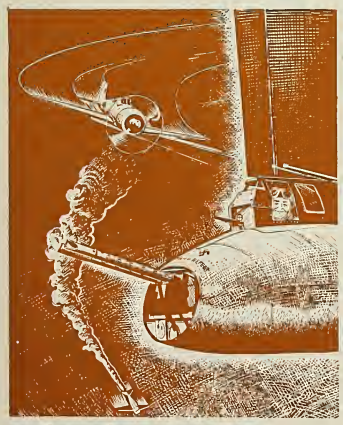
Eighth Air Force 17s and 24s flew 7,067 sorties against Axis targets during the year and averaged only 3.91 percent losses. Enemy planes destroyed by these lost American aircraft in fighting before they were shot down are not included in the tabulation of enemy planes shot down, probably destroyed and damaged.

The accompanying drawings represent an artist's conception of a typical bombing raid over Europe. Key positions in the crew of a B-17 are played up in the individual sketches, which were done by Phil Santry of the AAF Training Aids Division on the basis of reports obtained in Washington.

Action as portrayed in these drawings is the type of action that has become almost routine for our airmen engaged in daylight runs over enemy target areas on the European continent. ☆

Navigators have to train themselves to keep at their navigation; a tough assignment when the fighting is heaviest.

If a tail gunner gloats over one he shot down, another tough enemy might be looking him in the face before he knows it.



In some tight spots, it takes the combined strength of pilot and co-pilot to kick the B-17 around in a vitally necessary evasive manner.

Be Ready FOR ANYTHING

By Capt. Charles D. Frazer

Maj. John Mitchell (left) and Capt. Thomas Lanphier, Jr. At top, a P-38 takes off from an airfield in the Southwest Pacific.

"You can't be too good a gunner," said the Major. "When you jump a Zero up there at 30,000 feet, you have him in range for just a few seconds. Hit him squarely and he'll go down. Miss him and you may get your tail shot off.

"I know a pilot who has flown 200 hours as a wing man and has saved his leader's life many times. But he still hasn't a confirmed victory of his own. All because of poor marksmanship.

"I'd have knocked down at least four or five more Japs myself had I been able to shoot a little better."

And coming from the Major, this really means something, for Maj. John Mitchell is one of the best. He is credited with eight Jap planes, has flown 100 operational missions involving 200 hours in combat, and commanded a P-38 squadron in the South Pacific which has a record of sixty Jap planes destroyed and twelve probables.

Capt. Thomas Lanphier, Jr., was a flight leader in this squadron. Seven planes, seventy missions, 175 hours in combat—that's his score.

Mitchell is soft-spoken, serious, thoughtful. Lanphier is nervy, quick-witted, inclined to tell a story with dramatic gestures. Both were in the South Pacific from January, 1942, until June of this year—first in the Fijis, then the Solomons—and both know what it takes to be a front-line fighter pilot.

"Out there," said Mitchell, "a pilot must be ready for anything. You fly night and day, in rain, fog and every kind of soup imaginable. You fly in and out of short, bumpy fields that have been just chopped out of the jungle.

"The physical strain is enormous. On the ground the atmosphere is hot and humid and enervating, and you are likely to be waiting around in this heat when a raid starts and the fighters have to get up fast. There's a tremendous change in temperature, the cockpit cools off quickly, and you have pains all over.

"To an experienced combat pilot, these things are part of the game. But to the new flyer they are new problems. And there is only one answer—prepare yourself as thoroughly as possible before you ever reach the front."

Lanphier nodded his head rapidly.

"That's a good point, Mitch. Too many kids came out there trusting to luck. Well, you can't do that because there are two kinds of luck.

"For example, a lot of men seem to think they will have little or no occasion to fly on instruments. But they will, believe me. And it's absolutely essential that they know how.

"Others don't know enough about the equipment and how it works. Oxygen equipment, especially. We knew a fellow who bailed out of his airplane at about 30,000 feet when there was apparently nothing wrong. The only conclusion was that he lost his head from lack of oxygen.

"Then there is all the emergency equipment. We have seen priceless airplanes ruined just because some guy didn't know how to use the emergency landing gear handle."

"Keep in mind," said Mitchell, "that these mistakes are mainly a matter of neglect. During his training a pilot is given instruction in every phase of the job. But there are some things to which men in training don't pay enough attention.

"I can sum these up briefly. Gunnery, as I have said, can't be over-emphasized. We have daily gun practice out at the front but that can't make up for insufficient practice at home.

"Then there is formation flying and escort flying and night flying and instrument flying and practice in landing on short fields and a thorough knowledge of engines and dynamics. A man should put in every minute possible on those phases.

"Formation flying is vital. We fought the Japs all over the Guadalcanal and Solomons area for months and I can't remember a time when we weren't badly outnumbered.

"You can meet that kind of opposition in one way only—by sticking together. You *must* stay together, at least in pairs.

"This is probably the hardest idea to

get across to a new pilot. He arrives rarin' to go. The squadron commander keeps him out of combat for a while, sees that he brushes up on the phases of training I mentioned, and lets him watch the Tokyo Express go over a few times.

"At last he is sent on a combat mission. After all, that's the only way he can become a combat flyer. You can't practice a man into perfection.

"Well, those first two or three flights are tough for anybody. You're keyed up and excited and there's a hell of a lot of shooting going on and, first thing you know, this new kid breaks away from his leader. Perhaps he dives down and away after what he thinks is a straggler.

"If he gets home after leaving a formation like that, he is very lucky indeed. It won't happen often.

"A new pilot simply must accept the fact that his leader is experienced and must be trusted to get them through the brawl."

Mitchell and Lanphier concede that the conditions they faced in the Pacific, especially on Guadalcanal, were far worse than they are today.

Mitchell arrived at Guadalcanal in October, when the front lines were only half a mile from his tent, when machine gun fire and continuous bombing by Jap planes made sleep as unlikely as a visit from a pin-up girl. Conditions had improved only slightly in December, when Lanphier reached Henderson Field. Food consisted of Spam three times a day, when it was available. If you wanted a floor for your tent, you watched carefully and grabbed the crate from a new airplane.

Two Army fighter pilots tell why it pays to be well-prepared for combat flying.

Flyers were in "combat" on the ground as well as in the air. Jap snipers were bold and frequently slipped through the lines, one getting so close he fired a bullet into the pilots' mess table. Blackouts at night were complete, of course. You sat around a while talking over operations, but the flies and insects drove you under the mosquito nets early.

Aerial combat was touch-and-go for many months. Major Mitchell bagged his first Jap on October 9, two days after arriving at Henderson Field, got another on October 23 while on patrol over Guadalcanal and a third on November 7 while attacking an enemy naval force.

January was very active. Typical of the operations was a bomber escort mission on January 5, when Mitchell's flight of six P-38s was attacked by 25 Japs. The flight destroyed three planes and probably three more. Later on, Mitchell led six P-38s against thirty Zeros over Guadalcanal, getting two himself, and on January 29 he took off alone before dawn and shot down a "Washing Machine Charlie" —a Jap bomber Type 97 that was making a low-level bombing and strafing attack on the field.

Mitchell flew thirteen missions to the Kahili-Shortland Island area, 315 miles from Henderson Field, and one day made the trip twice.

Lanphier's record is no less brilliant. On December 23, the first day he flew combat from Henderson Field, he brought down a Zero over Munda while escorting a bomber sweep. Lanphier flew 24 escort missions to Munda in a single month; a 400-mile round trip, frequently on a two-a-day schedule.

On March 29 Lanphier led a flight of P-38s, accompanied by a Marine pilot, against float Zeros at Poporang Island. They destroyed eight Jap planes, then sank a Jap destroyer with machine gun and cannon fire on the way home.

When, on April 7, the Japanese attempted to raid the Tulagi-Savo Island area with 98 planes, Lanphier got three Zeros. His flight of four P-38s overtook eleven raiders at 30,000 feet, first shot down three planes, then finished off the remaining eight.

Lanphier racked up two more on April 18 while taking part in a sweep lead by Major Mitchell. While Mitchell climbed with twelve P-38s to furnish high cover, Lanphier and three others started the attack and brought down a total of six Jap aircraft.

P-38s were not the only planes they flew. On several occasions Mitchell and Lanphier flew P-39s as dive-bombers against Jap shipping or ground installations.

Frequently, when Jap units hemmed in on the island offered stubborn resistance, the pilots would dive-bomb the enemy with depth charges.

These charges left many Japanese dead without a mark on (Continued on page 44)

Changing prop blade of P-38 which nosed over.

Towing a fighter plane at a Pacific base.

Illustrated by Lieut. William T. Lent

"The terrific explosion killed three of the mechs and wounded the others . . ."

THIS IS YOUR ENEMY

-It's your life or his!

Twenty-two months of war have taught us many things.

We have learned that the enemy is not a superman—that he makes mistakes and miscalculations common to all men. We also know him to be a tough, smart fighter.

Reports from the combat zones tell of new techniques—and old ones applied more cleverly—with which the enemy is determined to outsmart us and outfight us. It is ample proof that we must know his methods as thoroughly as we know our own.

We must keep up with his tricks and his tactics, his propaganda, his national psychology, his strength and his weaknesses. We must be alert at all times—must take nothing for granted.

If you are inclined to be more curious than cautious, the enemy has special plans—and explosives—already laid for you.

Consider the ME-109 that sat there on a captured German airfield one spring day in North Africa. It looked harmless enough to the five mechs who jumped out of the jeep and ran to the plane. They crowded around the ship, comparing it with our own fighters. Then one of the more curious opened the cowling to investigate the instrument panel. The terrific explosion that followed killed three of the mechs and wounded the others.

More and more booty will fall into our hands as the Allied offensive rolls on. Often enough, as in this case, an abandoned piece of enemy equipment suddenly becomes a deadly weapon. The explosive charge hidden in the cockpit of the Messerschmitt did the work of a hand grenade or a bomb. The enemy had counted on our curiosity—and won!

Whenever possible, members of the Engineer Corps should inspect all captured enemy materiel. Engineers are trained to locate such traps and remove their explosive harmlessly. If the engineers don't happen to be around, only trained personnel should do the job. Regard *every* object left by the enemy as a potential booby trap. And if you discover possible traps, mark them well for the protection of others.

Fake for Bombardiers. The Germans have been known to flash on strings of phosphorous lights a few miles from the target to mislead our bombardiers. From the air the lights resemble incendiaries dropped by our own planes to light up the target. It is a ruse to trick bombardiers into dumping their bombs harmlessly in the phosphorous-light area.

☆ ☆ ☆

Sniper Plays Dead. One of the enemy can hold up a whole patrol—and inflict severe damage — when he plays it the smart way.

The smart guy in this case was a Jap sniper. He operated from a treetop and fired on an American patrol advancing up the New Guinea coast. The troops halted, located the sniper and fired. A body fell from a tree. The troops advanced and were fired on a second time. They stopped, fired, and scored another "kill." Then it happened all over again.

Investigation revealed that a single sniper had been holding up the patrol. The enemy had placed dummies in other trees and these dummies had been dropped by a pulley arrangement to make our troops think they had cleared the opposition.

The same technique was used elsewhere in the battle area. On one occasion the sniper's dummy was so regulated that it could be hoisted back into place. But the sniper wasn't invulnerable. He made the mistake of pulling the dummy back up too soon, giving away his ruse.

☆ ☆ ☆

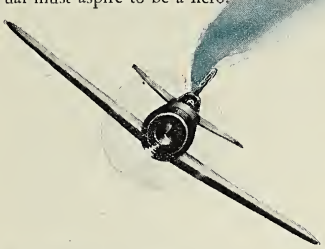
Armed Prisoners. Walking toward you with hands held high overhead in the gesture of surrender, prisoners look very much alike. You're feeling pretty good about your position. Maybe you get a little careless. The prisoners have been disarmed, haven't they? Or have they?

Certain German officers and men are reported to have been issued a special type revolver for use when taken prisoner. This weapon, built to fire 25 rounds, can be attached to a waist belt under the coat or tunic, with the barrel pointing outward. A wire connecting with the trigger runs inside the sleeve to the cuff. So armed, a German prisoner can hold his hands high over his head in surrender and still fire the gun at his captor. Feel good, if you like, about taking prisoners; just be sure they are not carrying hidden weapons.

☆ ☆ ☆

Jap Pep Talk. A Jap commander in the South Pacific felt called upon to address his troops in this manner:

"Endeavor to forget unpleasant incidents and to remember only the good. It is useless to brood over matters as an hysterical woman does. We are all thin from lack of food, but we must not show a haggard countenance when we get on the vessels. There is a saying that 'the Samurai displays a toothpick even when he hasn't eaten.' This is an example worth emulating at the present time. Since we have been here, there have been those among us who have worked well and also those who have been lazy. The men of the 'suicide squads' and those with similar aspirations are among the bravest of the brave; on the other hand, those who have neglected their duty can only be considered despicable. Every individual must aspire to be a hero."



Playing Dead. Enemy pilots have been known to simulate loss of control when our attacking fighters come within range and release long plumes of black smoke to give the impression that they have been hit and are out of action. At times the ruse has been employed to allay our attack and lure our aircraft into the range of other enemy planes.

☆ ☆ ☆

A Dream Come True. Nine weeks before Pearl Harbor, a Japanese soldier scribbled this note in his diary:

"September 29, 1941. Received a red letter (summons to the colors). . . . The inspiring dream of the coming war between Japan and America during my boyhood days is now a reality."

☆ ☆ ☆

The Germans Like Stragglers. "German airmen plan well and fight hard," reports Capt. Robert K. Morgan, bomber pilot veteran of 25 missions over Europe. "They don't go in much for heroics but they're cold-blooded in their estimates of results. They don't take unnecessary chances or over-match themselves if they can help it. But the Germans go after 'stragglers' every chance they get and are constantly thinking up new tactics and forms of attack to cause straggling."

☆ ☆ ☆

Japs Fake A Dogfight. In the air, as on the ground, things aren't always what they seem. An American fighter pilot found that out not long ago during an air battle in the Southwest Pacific. This pilot was without an opponent for the moment, and the other men in his squadron appeared to be taking care of the situation. Squinting into the sun, he spotted a dogfight in progress about 2,000 feet above him. The pilot decided to climb up and help his buddy. He discovered, just in the nick of time, that the dogfight was a sham battle being staged by two Jap pilots. They were hoping to lure up a lone American plane—and almost did.

☆ ☆ ☆

"A Typical Nazi Bully." A German fighter pilot shot down in North Africa was interviewed by an AAF Intelligence officer who closed his report with these remarks:

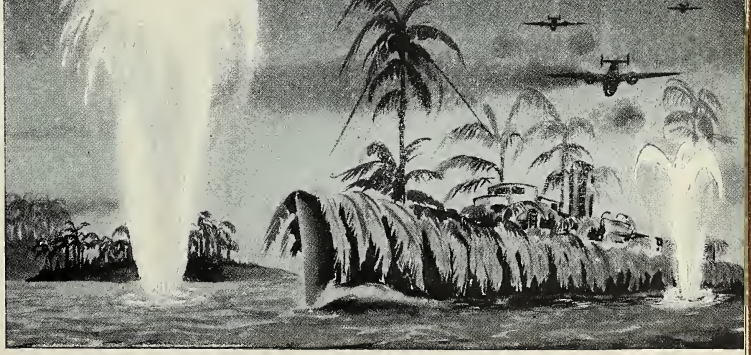
"—— is a typical Nazi bully. He is full of Nazi slogans without knowing what they mean. He has a guilty conscience about his activities in France and is afraid of what the French authorities will do to him. His morale is consequently low. He appears to be a habitual and not very clever liar and his statements should be treated with reserve."

☆ ☆ ☆

Make-Believe Island. The enemy goes all the way to achieve deception. Recall the "floating island" that turned up in the waters south of the Bismarck Archipelago near New Britain.

Our airmen became suspicious and went down to investigate. They found, not an island at all, but a large transport which the Japs had cleverly covered with palm trees and other tropical foliage in an effort to escape detection in the island-studded area.

Alertness paid dividends, however, and the transport was knocked out with direct hits. The inflammable camouflage quickened the end of the Jap vessel. ☆



OUR WOMEN PILOTS

By CHARLOTTE KNIGHT

Mrs. Betty Gillies was the first woman to fly a P-47 to an Army airfield.

AT an east coast airfield a P-47 roars in for a perfect landing. The pilot steps out of the cockpit of the Army's most powerful single-engine fighter and calls a greeting to the crew chief.

A few yards away an Air Force captain who had casually watched the ship come in does a hasty double-take. He turns to a fellow officer: "Good Lord, do you see what I see? The pilot! It's a girl—and *that's* a P-47!"

A C-47 in full war paint sits at a California base, warmed up and ready for ferrying to the middle west. Two girls in flying gear step up to the crew chief. "All set? Let's get going."

"OK," he replies good naturedly, giving them the once-over and wondering if someone has kidded them into thinking they could go along for the ride. "I'm just waiting for the pilots."

"We *are* the pilots."

In a few minutes the stupified crew chief is watching the big twin-engined transport gain the skies in a smooth take-off with the girls at the controls.

IN the control tower of an Army airfield in Texas there's a puzzled frown on the face of the operator. He'd swear that was a woman's voice asking for landing instructions. He checks the pilot's name —N. H. Love—but that's no help. It simply couldn't be a woman pilot for the plane is a B-25. He turns to the operations officer. Together they watch the bomber roll in at 110 mph and come to a stop. They look carefully as the pilot steps out.

"Well, I'll be damned," says the control tower operator. "I was right."

Elsewhere, P-51s, P-39s, C-60s, C-78s, A-24s and seventeen different types of smaller ships are being ferried around the country by a handful of women pilots, all members of the Women's Auxiliary Ferrying Squadron and all working for the Ferrying Division of the Air Transport Command.

The WAFS were expected to be flying A-20s, P-38s and P-40s by September.

The reception at no two fields is alike. Sometimes the girls are accepted without question into a fraternity that respects a good pilot regardless of sex, but often enough the atmosphere is considerably more chilly than it is upstairs. These rebuffs the girls have come to accept as part of the game. More often the reception is of the plain "I'll-be-damned" variety.

Whatever the reaction, the only thing that matters is that the WAFS' apprenticeship is over. Originally slated to ferry only training and liaison craft, they have now graduated to the big-league ships and can hold their own with the best of them.

The girls have been on the spot since the WAFS was organized in September 1942. Their smooth, white necks have been stuck way out and they know it. They've had to work hard and quietly to prove to a lot of doubting Air Corps Thomases that they could do a man's job. They've endured everything from patronizingly raised eyebrows to forthright resentment, and they've held their silence. And now they're saying it with combat ships—and saying it with the blessings of the Army Air Forces.

This is no sensation-begging affair, nor are these girls interested in usurping man's prior rights in the skies. They are not out to compete with men, but they *are* concerned with doing a man-sized job and doing it well. Today, woman's place is where she is needed. And until this war is won, that place is in the cockpit of ships women can fly from factory to field and, by doing so, release men pilots for combat duty.

At the moment their numbers in the

WAFS may be small, but many more will come, and soon.

All these women pilots, with the exception of the first WAF squadron of 25, have been, and are now being trained by the AAF Training Command. When they graduate they are eligible for membership in the WAFS.

The two organizations, although working in close liaison, are independent setups. There has been some public confusion about the two groups and in some quarters it is not yet entirely clear just who does which jobs. Here it is: The Women's Flying Training Detachment, organized by Jacqueline Cochran, now Director of Women Pilots, AAF, is a part of the Training Command; it *trains* the girls at Avenger Field, Sweetwater, Texas. The Women's Auxiliary Ferrying Squadron, on the other hand, is an operating unit which takes these pilots and puts them to work. A part of the Air Transport Command, it is headed by Nancy Harkness Love, now executive for the WAFS on the staff of the commanding general, Ferrying Division, ATC Headquarters of the unit is in Cincinnati, Ohio.

To date, four classes of AAF-trained graduates have joined the WAFS. They undergo a short period of Ferrying Division transitional training and then begin checking out on the different types of ships they will be called on to ferry. As it now stands, a girl will be allowed to check out on *any* plane she is capable of flying. Chances are this won't mean the multi-engined class, for there are many ships just too difficult physically for the average woman to handle. Besides, they will be kept plenty busy with one and two-engined aircraft.

A pilot must make five deliveries of a particular plane before she can go on to the next ship in a graduated scale based, presumably, on the complexity of the aircraft. In the Long Beach sector, for instance, this scale begins with the PTs and BTs, then graduates to A-24s, P-51s, C-47s, C-60s, B-25s, A-20s and finally P-38s. This particular range may vary in different ferrying sectors.

The domestic ferrying of combat planes has become an everyday job for the fair sex in the AAF.

The WAFS is split up at present into four ferrying squadrons, located at Wilmington, Dallas, Detroit and Long Beach. Members of the original group of 25 are stationed at each spot.

Neither the WAFS nor the WFTD is as yet a military organization, so both pilots and trainees are on civil service status. Pilots receive $250 a month plus $6 per diem on ferrying missions. They live in regular officers' barracks turned over to them for that purpose and enjoy all the privileges of officers.

THEY wear a standardized "attire" of their own consisting of a grey-green jacket, slacks or skirt, tan shirt and an overseas cap. On ferrying trips they may wear just shirt and slacks or GI cold weather flying suits, leather jackets and, of course, parachutes and head-sets.

They take no oxygen equipment since, like domestic ferry pilots of the opposite sex, they seldom fly above 12,000 feet on ferrying missions. Proud as they are of flying combat ships, they know quite well that merely ferrying a ship is one thing and putting it through its tactical paces is quite another. They are content to leave the acrobatics and the combat tactics to the men in the Air Force they serve. The girls merely "pick up a ship, fly her, set her down."

On return trips to their bases after delivering aircraft, the WAFS usually wear their regulation jackets and skirts, and are forever being taken for airline stewardesses. They are a little tired of being asked in airports, waiting for commercial liners to leave, whether "lunch is served on Flight 2" or "How long do we stay in Albuquerque?" or "Can I get a plane out of Kansas City tonight?" If the answer is merely "I don't know," the passenger often goes away muttering under his breath about inefficiently run organizations and letters of complaint to the president.

Nearly all of the WAFS' waking hours are spent in uniform. Since they are always on call, they figure there is little percentage in wearing their civilian clothes. When one squadron first went to Dallas, they were there three weeks before anyone saw a single woman pilot out of uniform. One night there was a dance at the Officers' Club. The girls went all-out for the occasion and donned long, flowing evening dresses, fixed their hair into evening coiffures, pinned flowers on their shoulders and arrived at the party. It was ten minutes before anyone recognized them.

Women ferry pilots have little or no private life. They work between fifty and sixty hours a week, often longer. One girl spent only four nights on her home base in six weeks. B-4 bags packed at all times, they must be ready to go on a mission on an hour's notice—even less. When they'll get back to base is anybody's guess. In winter flights the chances of being grounded somewhere along the way are high. Last December one pilot, ferrying a PT-13, was weathered in for 21 days in a small mid-western town.

At other times the in-between stops provide their own drama. Last winter, four WAFS grounded in an Illinois town narrowly escaped injury when a violent explosion blew up a garage directly opposite their dining place. The same group

Last minute map check in the WAFS comfortable "alert room." Left to right: Gertrude Meserve, Nancy Batson, Terese James, Esther Nelson, Dorothy Fulton and (kneeling) Betty Gillies, commander of the WAFS for the 2nd Ferrying Group, Wilmington, Delaware. Below, Evelyn Sharp brings in a C-47.

was trapped the following night in a hotel fire in Springfield, Mo., and escorted down ladders in the middle of the night. But the bad luck for the week was not over. The flight leader arrived at the field next morning to pick up her plane and was greeted with the announcement, "Oh, we're so sorry, miss. Somebody ran into your plane last night. It will take some time to get it repaired." And it did.

On base, you'll find the girls either in school or in the ready room. School is in continuous session at ferry bases. Pilots, when not flying, are expected to attend. It keeps their minds fresh on such subjects as meteorology, navigation, radio and new techniques in flying. They like it.

Wherever they are, their ears are always subconsciously listening for their own names to be read over the loud speaker system. Maybe it's 0600 o'clock, 1400, or perhaps they're in the middle of a coke in the Pilot's Loft.

"Clark . . . Richards . . . McGilvery . . . Miller . . . Scharr."

Names are up. They report to Operations, collect maps and orders, return to their quarters, pick up the B-4s, draw their chutes, and they are on their way. Perhaps they go to a nearby aircraft plant by car or if it's a base some distance away, they may fly by Army transport. They arrive, pick up the aircraft to be ferried and take off. They fly no night missions, so unless they can complete the mission an hour before sundown, they land at a previously designated airport, check in at Operations, send an RON (remain overnight) to their headquarters, find a hotel and fall into bed.

Up at 0600 the following morning, they resume the flight. After their mission is accomplished, they collect their receipt forms, order a car to the commercial airport, present their Priority BB credentials for a reservation on the next plane—and wait. This is the worst part. They read, play solitaire, kill time in the airport restaurant, wander around restlessly. Finally they are on the plane and headed for home. Maybe they get back to base at midnight, but "woman's work is never done." There are shirts to wash and iron. There are clothes to clean and press, for clothes must be kept spotless. This may take until 0300 o'clock. Bed, breakfast, school. By noon, perhaps they have new orders and are off again.

Sometimes getting back is not so easy. Once they've delivered their aircraft the pilots are at the mercy of the public carriers. And many fields are hundreds of miles from the commercial airways. Not infrequently that means trains, or worse, buses — buses jammed with war-time travelers. Often they have to stand for 200 miles or more to get to a commercial airline.

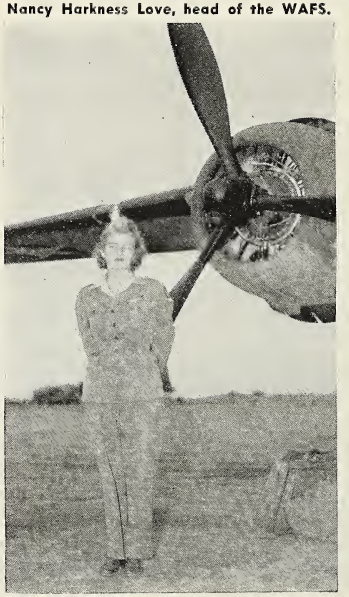
There are times when sleeping quarters present their own problems. Several WAFS, ferrying Cubs, once had to land at the Marine Base at Quantico, Va. Anxious to provide true Virginia hospitality, the Marines took part of the VOQ, partitioned it off with a sort of "wall of Jericho," and posted a sign "Keep Out! Ladies Present." This time, the ladies had the situation well in hand.

Nor are these women pilots immune from the flying episodes that keep ferrying from being humdrum. You'll hear about the time six WAFS flew some PTs from Great Falls to Billings, Mont. Twenty minutes out, the flight leader noticed all five of the flyers below circling without apparent reason. There were no radios in the ships by which she could ask the score. She flew down, straightened them out. Within a few minutes the five planes started circling again.

Again the flight leader came down. Again they straightened their course. And again they circled. This routine kept up until a distraught flight leader located the first alternate airfield she could find on the course and signalled for the girls to land—a tricky business because of icy runways, high snowbanks and too little room. The leader landed, crossed her fingers and prayed. The girls came down safely, rushed up to one another and all started shouting at once.

"Look," said the girl who had been designated navigator of the flight, "I lost my maps, all of them, twenty minutes out. I kept circling to let you know something was wrong and to let someone else take the lead. And of course everytime I circled, all the other planes followed instructions and circled after me. Couldn't you tell I must be off course?"

Nancy Harkness Love, head of the WAFS.



But it developed she had been *on course* all the way, which is the reason the flight leader couldn't imagine what was wrong. With nothing but a watch and a compass, the girl had done quite a job of navigating.

There are no days off in the ferrying business. The girls would not take them if there were. They would much rather stay on base than take a chance of missing a flying assignment. Like the men, they would rather fly than eat.

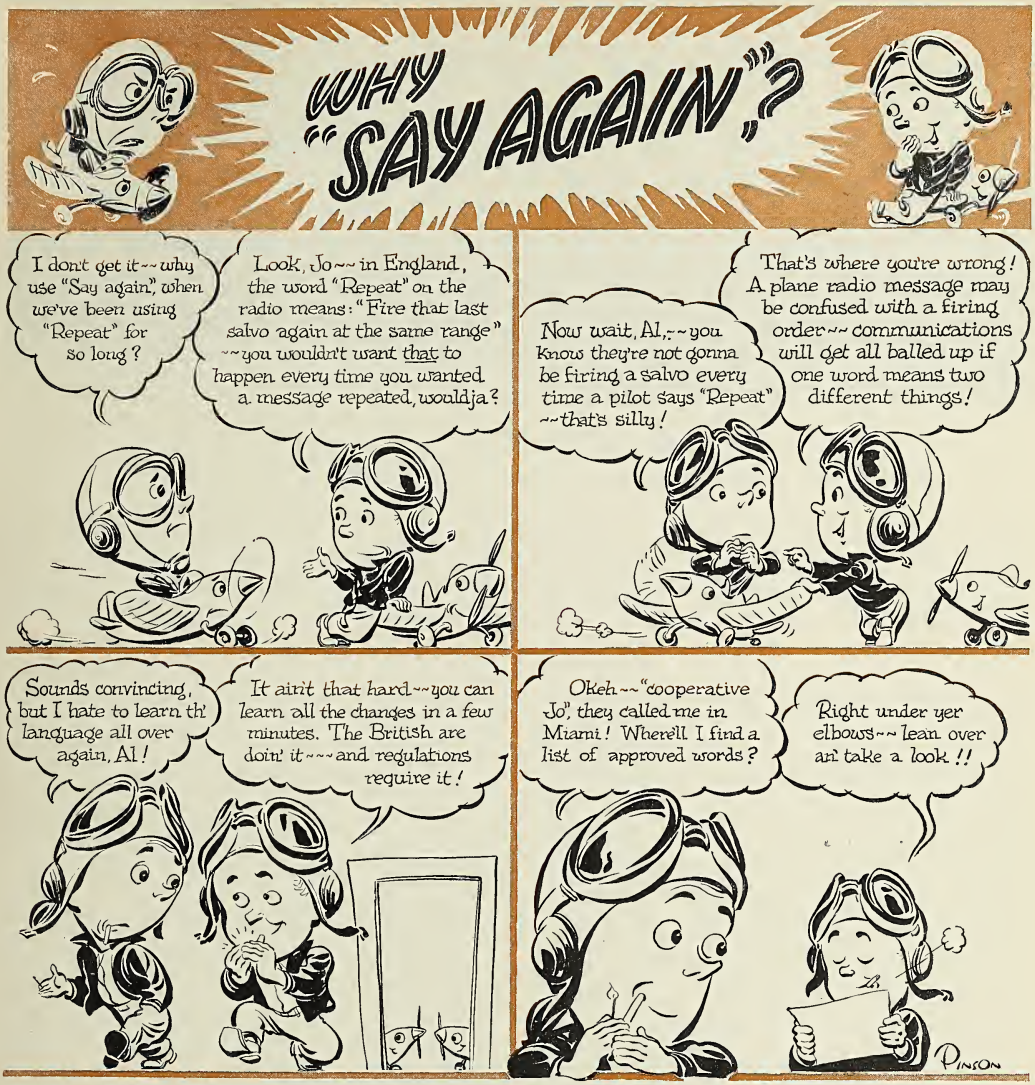
Although many of the original group of WAFS are young in years, all of them were seasoned pilots long before they took these jobs. Original requirements called for 500 hours flying time, but the average for each of the girls in the first group of 25 members was 1,162 hours.

Mrs. Love has spent the last thirteen years flying. Before the war she was the first woman to ferry planes to the Canadian border, where they were towed across the line in compliance with the Neutrality Act. With her husband—now Colonel Robert Love, deputy chief of staff for the Air Transport Command—she initiated many flying clubs in colleges. A year before the organization of the WAFS, Mrs. Love worked with the ATC. She mapped ferry flights and learned command procedures and routes.

The first pilot to qualify for the WAFS was Mrs. Betty Gillies of Syosset, Long Island. She had 1,400 flying hours when she joined the organization, holds almost every kind of rating, was for two years president of the "99," an international club of women flyers formed by Amelia Earhart. At present she is squadron leader of the WAFS in the 2nd Ferrying Group, Wilmington, Del.

Almost without exception, the girls composing the original WAF squadron were professional flyers before the war. Some were instructors; several ran airports. Mrs. Lenore McElroy, executive officer of the Romulus (Mich.) group, had 2,500 flying hours and eight years as an instructor when she came into the WAFS. Evelyn Sharp, with 2,950 hours, taught flying in California. Nancy Batson came to the WAFS direct from Embry-Riddle Flying School in Miami where she was an instructor. Mrs. Esther Nelson operated a flying school in Ontario, Calif. Dorothy Fulton, who had flown 2,500 hours, ran her own airport in New Jersey.

Bound together by mutual interest in flying and in releasing male flyers for combat, these girls, all of them under 35, have put homes and families behind them until the war is won. Many are married and several have children. Almost all have relatives or sweethearts in the Air Forces who, they would like to think, are as proud of the job the girls are doing as the WAFS are of their fighting brothers. ☆



VOCABULARY

Approved Words	Meaning
OVER	My transmission is ended and I expect a response from you.
OUT	This conversation is ended and no response is expected.
ACKNOWLEDGE	Let me know that you have received and understood this message.
WAIT	I must pause for a few seconds. If the pause is to be longer than a few seconds, "Wait out" should be used.
SAY AGAIN	Repeat.
I SAY AGAIN	I will repeat.
HOW DO YOU HEAR ME?	Can you hear me?
CORRECTION	An error has been made in this transmission. The correct version is . . .
WRONG	What you have just said is incorrect. The correct version is . . .
THIS IS	Instead of the term "from." Example: "Central Tower—this is Army 1234" or "Army 1234—this is Central Tower."
ROGER	I have received all of your last transmission.
WILCO	Your last message (or message indicated) received, understood and (where applicable) will be complied with.

(Combined U. S.-British Radiotelephone (R/T) Procedure Basic Field Manual 24-9)

Flight Control Command

AIRDROME CONSTRUCTION IN NORTH AFRICA

Filling bomb crater on North African airfield.

By Brig. Gen. D. A. Davison

Chief Engineer, Northwest African Air Forces.

PROGRESS of aerial operations on any front depends to a great extent on the speed and efficiency of airdrome construction. This is an obvious fact not generally appreciated. As Maj. Gen. Eugene Reybold, Chief of Army Engineers, has pointed out:

"A key to air power, the engineers now lay down in a few days airfields which a few years ago would have taken months. Engineers are still the Army pioneers."

Nowhere has this been better demonstrated than in North Africa.

When U. S. forces first landed on that coast, there were only nine airdromes in condition for use by our bombers, fighter planes and transports. There are now more than a hundred fields in the same territory. Had it not been for ample supplies of heavy equipment and the skill of our aviation engineers, the victory in Tunisia might have been long delayed.

From the beginning, manpower represented one of our major problems in North Africa. We had several battalions of aviation engineers. In view of the size of the job to be done and the elements confronting us, this was not enough, and the strength was later doubled.

We were well equipped, however. Each unit of aviation engineers had heavy earth-moving equipment, rock crushers and a fairly good supply of dump trucks, so we were prepared for construction jobs requiring the movement of a considerable quantity of earth.

This equipment is no different, piece for piece, than that which you would see on any large road-building job or other sizeable construction project in the United States. But it is vastly superior to anything possessed by the British units and probably by the enemy.

For some time after we landed, the shortage of such equipment created a bottleneck, but this was eventually rectified. Today in North Africa there's enough heavy-duty equipment to handle almost any demand placed on our units.

Mud was our chief antagonist in Africa. Our airdromes were built during an unusually long winter and a very wet spring. We overcame the mud in the only way possible—by prodigious labor.

Our battle with African mud began as soon as we landed, when an effort was being made to pull our units forward from the bases on the west coast.

Initially, we were able to concentrate our air strength around Casablanca and as far forward as the Oran area, occupying principally the airdrome named Tafaraoui. But to any engineer from North Africa the word "Tafaraoui" doesn't mean an airport. It means a malignant

The role played by aviation engineers in the North African victory is a pattern for future offensive operations.

quality of mud — something like liquid reinforced concrete of bottomless depth. We still speak of any particularly bad type of mud as "Tafaraoui." At Tafaraoui there were two partially completed hard-surfaced runways when we took it on November 10, 1942.

La Senya, now used as a depot, wasn't available to us at first because it had no runways, and they were quite essential as we were just getting into the wet season. When the fighting ships numbered several squadrons, we still had only Tafaraoui from which to operate them.

I remember a night in November when many fighting ships were on this airfield and most of them were mud-bound because they couldn't reach the hard-surfaced runways from the dispersal points. Something had to be done quickly so we could get out of there. Some of the ships were flown forward to Maison Blanche, at Algiers, which was hardly better from the mud point of view, but this move gave us two fields from which to operate. Maison Blanche had part of one hard-surfaced runway at the time.

Congestion was equally shared between Tafaraoui and Maison Blanche, the only difference being that we tried to operate the B-25s, B-26s and P-38s from Maison Blanche, holding the B-17s and their fighter cover back at Tafaraoui. It was necessary to fly an additional 160 miles from Tafaraoui, but there were no other airdromes. At Maison Blanche, also, we suffered from congestion because of lack of any opportunity to disperse. It was clear that we had to expand again.

Our problem seemed to be a simple one. That is, it could be analyzed simply. We needed more airdromes, dry airdromes, and some place we could disperse the planes. We knew that a drier terrain could be found in the central plateau than along the coast. So we went up into the Telergma area. There we found a small postage stamp field, but nothing from which we could operate B-26s. And it was the B-26s that General Doolittle wanted to get up forward to take advantage of the shorter range. Telergma was considered quite well forward in those days.

From December 2 until December 7 a group of aviation engineers, with some French troops and Arabs, made a field out of Telergma from which we could operate the mediums, and that field has hardly lost a day's operations since we opened it on December 7, 1942. Today, the Telergma area has been expanded until it contains ten airdromes — all of

them suitable for the operation of heavy bombardment planes. Most of the fields share some of their hard standings with their fighter cover. Two pairs of fields are so situated that they give P-38 escorts a satellite field to themselves.

The Telergma fields served to bring the mediums quite far forward and helped solve the problem of dispersal.

Next, we heard about an extensive plateau which had been used as an airport at the desert oasis of Biskra, which is well through the Sahara Atlas range and down into the Sahara Desert, where it is really dry. We flew down to Biskra and discovered that there was a field which could be expanded. General Doolittle was so anxious to open up Biskra as a new base for his B-17s, and thus get some of them out of Tafaraoui, that we made our first use of airborne companies of aviation engineers, two of which we had landed and were holding back at Port Lyautey, nearly 1,000 miles away.

We sent troop carrier C-47s back after them and their equipment and flew them to Biskra. Twenty-four hours after their arrival we had the first B-17s come in from Tafaraoui. After the shift of the base up to Biskra, it was never necessary to go back to Tafaraoui with the B-17s because before the dry season broke for the Sahara, as it did about March 15, we had already converted the Telergma area for heavies. We pushed the mediums on forward, and the heavies went from Biskra into the Telergma area. That about summarizes the struggle we had in the early part of the campaign.

Then came the task of kicking the Axis forces entirely out of Tunisia. We began to prepare our airdrome program for this second phase of operations.

From an engineering point of view, the problem presented by the needs of the Tactical Air Force was most interesting. Its airdrome story can be told in terms of two specific units—the British RAF 242 Group, under Air Commodore Cross, and the 12th Air Support Command, under Brig. Gen. P. L. Williams.

The 242 Group started out with a single airdrome at Souk El Khemis and finally developed this into a group of eleven airdromes. All are built for fighters. That is, the airdromes are approximately 4,500 feet long and from 200 to 600 feet wide. They are distinctively named after London's railway stations; Euston, Victoria, Charing Cross and so on.

General Williams' Air Support Command came into the picture when the American Second Corps first fought with the British under General Lloyd Fredendall in the Tebessa, Thelepte, Kasserine and Sbeitla areas.

THE initial successes of the Second Corps permitted us to put an airdrome at Gafsa. It became General Williams' job to cover the south flank of the fighting forces right up until the time they were pinched out, or pushed forward, by the Desert Air Force. For instance, when the Second Corps was withdrawn from south of the First Army it was moved around to the north where, under the command of General Bradley, it later distinguished itself so magnificently in the Battle of Tunisia. We increased the number of fields for the 242 Group, particularly up along the coast.

Some of the fields we made never had an airplane land on them for the simple reason that the final break-through came so quickly that additional fields in this rear area were no longer necessary. We were able to make use of fields in Tunisia which had been held by the enemy.

From an engineer's point of view, the key word for the Tactical Air Force was "speed." They needed their fields in a hurry. In the case of the Air Support Command, we found that General Williams' minimum requirements called for the construction of several fighter fields. These we built in a succession of groups as his command moved forward.

At the beginning of the campaign, long before the February reverses in the vicinity of the Kasserine Pass, we had constructed several fields in the Thelepte area. All of those fields had to be abandoned at the time the Germans pushed in through the Kasserine Pass and reached the ridge east of Tebessa. We did abandon Tebessa and Youks Le Bain, pulling back into a group of fields to the west, but, actually, we didn't have to sacrifice even the supplies left behind. The Germans never got through to these fields for we were back again in the Thelepte area almost as soon as the Germans were out of the pass.

While in the Thelepte area we received word that General Williams wanted fields built in the Sbeitla sector. Seventy-two hours after he made his request we had completed the reconnaissance and constructed all of them. This reflects much credit on the officers and men who actually did the work. It is a fact worth repeating that in three days General Williams actually moved into these fields, none of which existed 72 hours before.

In building this group of fields I recall that one company which constructed the most easterly of them moved out in front of the outpost of the First Armored Division. The first night, when in checking up on the location of the companies I went through the lines of this Division, they stopped me and asked if I knew I was going out in front of their patrols.

"THE BEST EVIDENCE"

This story of the aviation engineers in Northwest Africa is the best evidence yet presented on rapid airdrome construction for a large air force in a new theatre. When I visted this theatre last December, the obstacles of mud, rainy weather, shortage of equipment and difficulty of supply were handicapping the untiring efforts of our engineer troops. But more men and especially more heavy equipment kept coming, and the difficulties were overcome. As General Spaatz said in commending his aviation engineers, they "never failed to accomplish their objectives in time."

The aviation engineer component of the Army Air Forces now numbers over 100 battalions, many of which are overseas. This story of achievement will be a particularly helpful and stimulating one to the units still in training at home. It also presents strong justification for the special type of engineer unit and training that has been developed for the Army Air Forces. General Davison had assisted in this development as commanding officer of the 21st Engineer Aviation Regiment in 1940 and later as Engineer of the G.H.Q. Air Force. He thus brought to his task with the Northwest African Air Force an understanding of their needs that helped build the fine teamwork described herein.

S. C. GODFREY
Brigadier General, U.S.A., Air Engineer

A surveyor and grading machines work simultaneously on a new airbase site.

The same field three days later is completed and ready for aircraft operations.

I said I was looking for a certain engineer company and asked if it were out in front. They replied, "Yes, if you mean those damn fools who didn't pay any attention to us and took those big machines out. We think they are about ten or fifteen miles down the road." I found this company dug in with its defense weapons in place, already at work, and fully aware that they were in no-man's land.

General Williams told me he would trust that group of engineers to go anywhere for him and build any set of fields. He said that just as soon as he was told those fields were ready for occupation he would move his units up without even making an inspection because he was confident this engineer unit knew his needs and would supply them.

From Sbeitla we made a considerable jump forward. General Williams stayed in the Sbeitla group until the Eighth Army Desert Air Force was pretty well along. The Eighth Army had broken the Mareth Line by this time and moved in north and west of Gabes. General Williams' next jump was to the LeSers area.

Here we built six fields. The British airdrome construction units came down and helped us, so it was a combination of American and British manpower with American heavy equipment which finally finished the six fields in the LeSers sector. I remember being at one of the fields (called LeSers 3) about 1930 or 2000 o'clock one Sunday night. There were four blade graders working in tandem, slowly trimming the field into final shape. A convoy of two-and-a-half-ton trucks, driven by big, husky colored troops, was bringing in gasoline — tons and tons of gasoline. General Williams' scouts, using jeeps by the scores, were coming in, and the signal trucks were arriving. We finished the field that night. At dawn one of his groups of P-40s moved in and settled down.

The 242 Group and General Williams continued to fight here until after we were able to move forward to former German fields in the vicinity of Tunis and Bizerte. We had anticipated a great deal of difficulty with those Tunisian fields because of the thoroughness with which the Germans mined certain areas. There was very little to worry about, however, because the break came so rapidly that the Germans had no time to mine them.

However, in one runway of the group of fields between Bou Arada and Pont du Fahs we took out 1,788 anti-tank mines. That sounds as if it were a hazardous undertaking, but it was not. We used a technique for de-mining an area which the aviation engineers had developed in their school. When we discovered there were mines in a locality — which we could do by putting men out at intervals of fifty feet and moving forward each with one of our excellent mine detectors —we would close into that area. Having

Unloading a bulldozer from a transport.

determined the pattern, if one existed, and where the individual mines were, we would then send two men forward. One would creep on his hands and knees and very gingerly scrape away the earth — usually eight to nine inches.

This first man would uncover the mine and neutralize it. That, however, didn't necessarily make the mine safe for it might have been booby-trapped with another exploder screwed in on the side or the bottom. If such were the case, the mine would be anchored into the ground. If you lift or try to move a booby-trapped mine you set it off—even though the central fuse has been taken out. So the task of the first two men was simply to uncover the mine and carefully feel around it to see whether it was booby-trapped.

Next, two more men would come up and explode the mine. By lying flat on the ground we were in little danger of being hit. In fact, we never had a casualty while de-mining a field. It took us about eight hours to take up these 1,788 mines — not a particularly hazardous or long, drawn-out task.

If we had been forced to apply that technique to each one of the fields in Tunisia, however, it would have been quicker to build new fields. As a matter of fact, we had selected the sites and were prepared for the construction job.

The 242 Group later moved forward from its fighting positions and General Williams' Air Support Command moved out from the LeSers group. We built seven or eight airdromes at the new positions, including one on the beach of a dry lake. Those were not captured German bases. They were all new.

The problem of General Doolittle's Strategic Air Force was very much different from that of the Tactical Air Force and, from an engineer's point of view, much simpler. He wanted airdromes from which mediums, as well as heavies, could carry offensive blows to the enemy. His targets were Sicily, Sardinia, Italy and Tunisian ports of Sousse, Sfax and Gabes.

The principal bottleneck of the Strategic Air Force was not so much airdromes as supply. I have described how they finally worked from Tafaraoui up to Maison Blanche and then to Biskra.

We knew from the meteorological reports that weather was good at Biskra until March 15 — the beginning of the high southerly wind coming up across the Sahara, which literally covers everything with sand. We planned to get out of Biskra about March 10. We did it by moving the heavies into the Telergma group where we already had ten airdromes. There was very little work to do, since a field that will accommodate a B-25 or B-26 will very easily take a B-17.

The problem was to get new grounds for the mediums which had been occupying this Telergma group. We moved the mediums forward to the Montesquieu area where there were five fields — two near Sedrata in the west and two at Ouenza in the east—a group of fields that nicely accommodated these planes. One of the Ouenza fields is as nearly an unlimited field as I have ever seen. We just arbitrarily decided where to stop. It was three miles long, all as flat as a billiard table. That flatness is characteristic of the plateau land between the Maritime Atlas and the Sahara Atlas ranges.

The heavies, having once moved to the Telergma area, remained in operation there continuously throughout the campaign and are still using those bases.

Just as "speed" represented the key word for the Tactical Air Force, and "supply" the key word for the Strategic Air Force, the term "permanent construction" is characteristic of the problems we had with the Coastal Command. This command was charged with convoy cover and antisubmarine activities.

Coastal airdromes *(Continued on page 21)*

PX

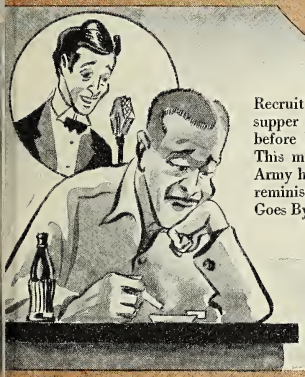
AAF EXCHANGE

(DOMESTIC)

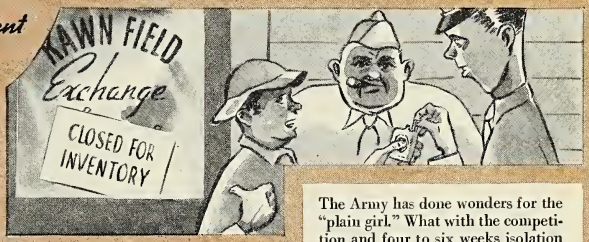
by Lieut. William T. Lent

Godfrey Stuyvesant Giltedge III has just been made a corporal and is bent on overwhelming the local smart set during off-duty hours in a suit of tropicals with shoulder straps and oversize chevrons. It's "no sale" for the clerk, however, who quotes Godfrey excerpts from AR 600-35.

With the advent of the WAAC there came a rebirth of G I chivalry. Nowadays even dyspeptic top-kicks catch themselves smiling occasionally. Here First Sergeant Stone graciously assists a cute little auxiliary with her breakfast tray. Time was when a person speaking to the Sergeant before he had sipped his morning coffee was a cinch to pull a week's latrine duty.

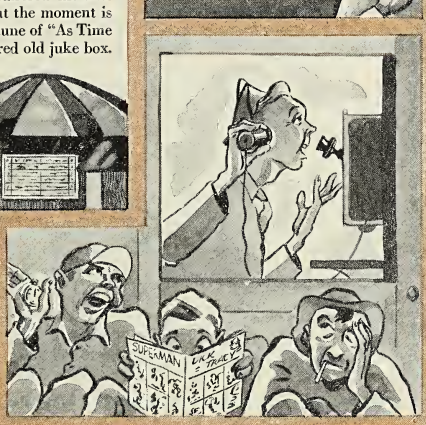


Recruit Tucker used to sing for his supper over the national networks before his draft number came up. This morning he suffered his first Army haircut and at the moment is reminiscing to the tune of "As Time Goes By" via the tired old juke box.



The Army has done wonders for the "plain girl." What with the competition and four to six weeks isolation in recruit camp, many a soldier begins to see the beauty hidden in Winnie the Waitress. Winnie has her points, at that.

The mooch. Three dollars will bring you five on payday. He must get his uniforms from the cleaners for Saturday's personnel inspection. He'll probably repay the three and forget the two on payday, but borrow ten the next day. What a system.



PX-ograms are almost as pernicious as latrine-ograms and certainly no more reliable. Staff Sergeant Bellows has it straight from the surgeon's office that all permanent party men soon will be given staphylococcus inoculations preparatory to shipping to Zanzibar.

PREPARE FOR INSPECTION

ADMINISTRATIVE • COMMUNICATION • TACTICAL • TECHNICAL

TIMELY ADVICE FROM THE AIR INSPECTOR

Matters presented here are informative only, and are not to be considered as directives.

THE need has been felt for a medium ta disseminate Army Air Forces inspection infarmation ta the field, and a sectian of this publicatian will be devoted monthly to serving that purpase. Helpful suggestians and impraved methods of daing the jab will be included. It is intended that the information will be beneficial not anly ta the inspectar, but alsa to the mon being inspected.

Inspection cancerns every man in the Army Air Farces, fram the privote who pours gasaline inta a plane ta the general who ardered its flight. The mon in uniform is either an inspectar or an inspectee. The inspector is nat immune to inspection, for an occasion he himself becomes the inspectee.

The purpase af inspectian, as stoted in AAF Memorandum 120-6, "is ta insure the highest possible efficiency of all camponents of the Army Air Forces and to determine the degree of their efficiency at frequent intervols. . . . It must caver every individual, every activity, and every item of supply ond equipment."

Inspection reoches down to check whether corrections in the sick baok have been initioled ar whether technical arders have been properly filed, but the moin mission—fitness for battle—shauld, like Peorl Harbar, always be remembered.

The underlying principle af the AAF inspectian system is decentrolizatian ta lawer commanders and supervision by their next higher commanders. Inspection is not primarily a "dress porade" affair, but a work-day proposition.

In the jab af getting ready for battle, argonizations and individuals are inspected olong the line by representatives of their own ond higher commands. Then, when they reach the staging area, they are met by a "POM" (Preporation for Overseas Mavement) team af inspectars fram the Office af The Air Inspector, Headquarters AAF. This team is composed of technical, tactical, odministrative and cammunication experts. They wont the onswer, fram first hand observatian, to the question, "Are you ready?"

To help answer thot questian with a strong affirmative, The Air Inspectar will pravide on these pages tips ta inspectors and inspectees, activities requiring inspection emphosis, and pertinent changes in regulatians and directives, with a questian ond answer section. Ideas and information from the field are welcame. AAF Memorandum 120-6 autharizes direct communicatian between statian, group, and higher commonders and The Air Inspector on matters pertaining to inspection.

JUNIUS W. JONES,
Brig. General, U. S. Army,
The Air Inspector.

Get Him Paid

SEEING that you are paid promptly, soldier, and avoiding embarrassing moments is a major interest of many persons in the Army Air Forces, including the Commanding General himself. Payment of troops is a function of command which receives the personal attention of all commanding officers. They are responsible for submitting to disbursing officers regular or supplemental pay rolls or individual pay vouchers. These should cover all enlisted men either permanently or temporarily under their command who are entitled to pay, so that payment may be made at least once a month (WD Circ. 114, 1943). Inspectors check frequently to see that pay is not delayed. Your job, soldier, is to have your Form 28 (Individual Pay Record) with you at all times. You are not in uniform without it. You should know when entries are to be made in it and how you can get paid on it. If you don't know, look up a letter addressed to you on the subject from AAF Headquarters (February 13, 1943). It should be on your bulletin board.

Service Record Trouble Overseas

AN inspector general in the Africa-Middle East Wing points out in an action letter that many service records had not been indorsed before they left the United States. Was your station one of those which overlooked this?

Plane Facts Worth Noting

NOTES from the scratch pad of a technical field inspector after making his rounds inspecting aircraft:

Fuel line clamp loose on line from wobble pump to carburetor . . . Oil separator screen plug clogged up . . . Small quantity of kerosene in magneto breaker assembly . . . Bad hose on fuel line between wobble pump and carburetor . . . Hose in need of replacement at C-2A strainer . . . Disconnected oil breather line at engine . . . Dirty filter in fuel analysis cell . . . Rubber battery overflow line in need of replacement . . . Indication of oil leak at oil drain fitting . . . Wheel cowling top bolt loose . . . Landing light reflectors in need of cleaning . . . Hydraulic reservoir filler cap frozen tight . . . Flap universal joints in need of cleaning and oiling . . . Bolt missing from throttle quadrant . . . Airspeed indicator light out . . . Front cockpit emergency exit handle not safetied . . . Fire extinguisher in need of refilling . . . Sheared unit on spark plug cooler, No. 4 cylinder . . . Upper rear engine plug not safetied . . . Baffle plate nuts loose, No. 2 and 3 cylinders . . . Left wing spar cracked at inboard end . . . Control cables in tail section dirty . . . Left wing walk needs replacing . . . Cracked braces on wheel wells . . . Bolts loose and rubber worn on baggage compartment door . . . Mooring kit incomplete . . . Engine gauge light inoperative . . . Cockpit light reflector missing. How many of these points apply to your plane?

Efficiency Ratings for Officers

Are you commanding officers evaluating the efficiency of officers in comparison with that of other officers of similar grade? In a tactical group inspected, all officers of one squadron were rated "superior" on their Forms 66-1, and all officers of another squadron "satisfactory." The ratings were obviously worthless. We would like to think—and have the Axis think—that all the officers of a squadron are superior, but this is not the case. Likewise, all the officers do not normally fall into the satisfactory class. Ratings are particularly important overseas where there is frequent shifting of personnel.

Radio Code for Victory

"Yes, I could take code at about twenty words a minute when I finished radio school, but now I'm pretty rusty. I've even forgotten the alphabet."

Hamlet's soliloquy has no sadder words than these. Yet squadron commanders overseas, desperately in need of a radio man for a bombing mission, are familiar with them.

Unit commanders should see that classification cards are checked frequently to be sure that all their radio men are receiving code practice, whether on real or simulated equipment. (A newly activated squadron at a Nebraska base used oscillator tubes and speakers from old radio sets for code practice before receiving its regular equipment.) In training flights, numerous special messages should be transmitted between ground and flight operators to augment routine reporting of position. You yourself, soldier, should have the initiative to keep off that rusty list.

Right Tube at Right Time

Most airborne radio operators know that there is a kit of spare radio parts, such as fuses, tubes and dynamotor brushes, stowed in the airplane. But how many check the contents of this kit periodically to be sure that all necessary parts are present, and how many do enough "tinkering" to be able to spot trouble and make necessary replacements? The ability to replace the right tube at the right time may some day mean the difference between getting home for supper and eating emergency rations in a dinghy.

Plenty of Marksmanship Badges

An enlisted man wants all that is coming to him, and that includes his marksmanship badge. Many men have not had the opportunity to see how their badges would show up under a South Sea sun because the United States base at which they fired their course had no badges. Word from the Philadelphia Quartermaster Depot is that there are plenty of badges and bars there, and base quartermasters and supply officers are advised to forward requisitions to the depot. (AGO Memo. S600-11-43). *Prepare for inspection* with a supply of badges.

Wastage of Food

Conserving food doesn't mean we must lose our reputation for being the "best fed army in the world." It means that you mess officers and sergeants in the field—in Tunisia or Texas—must check the waste going into garbage cans.

Wastage can often be traced to the fact that mess officers are not getting accurate reports on the number of men to be served. Men are transferred out, and the mess officer is sometimes the last one to be informed. This is particularly true in large consolidated messes.

Also to be checked is whether there is prompt delivery of perishables to bases. At one midwestern base, meats were delivered in a spoiled condition. An inspection revealed that the meats were sitting out on a depot platform for long periods because a local trucking concern which had the delivery contract did not have enough trucks to handle the shipments promptly. The quartermaster then made arrangements to pick up the meats in government vehicles.

Mail Must Go Through

Mail clerks, where do you deliver the letters for the men of your squadron? If you are delivering them on bunks you are doing an injustice to your buddies. Letters (some with money from home, and you know how important these are) become lost through delivery on bunks.

Note to mail clerks in tactical units: Have you seen a copy of FM 12-105? It tells you how to *prepare for inspection* in the handling of mail overseas.

☆ HERE ARE THE ANSWERS

Q. Where can details be found on the requirements for service and liaison pilots?

A. Detailed requirements are outlined in AAF Regulation 50-7, February 5, 1943.

Q. WD Circ. 303, 1942, directs that commanding officers will not require special creasing of shirts by laundries and cleaners. Can a man's wife crease his shirts at home?

A. No. Wearing shirts, the fronts or backs of which have been specially creased, is forbidden. (WD Circ. 122, 1943)

☆ ☆ ☆

Q. Does an officer on limited service have a chance to go overseas?

A. Yes. Provisions are outlined in WD Circ. 86, 1943.

☆ ☆ ☆

Q. Can an enlisted man in an attached service apply for transfer to another unit in the Army Air Forces for which he is especially qualified by civilian training?

A. Yes. Under no circumstances will a man possessing scientific, professional or technical skills of which there is an acute shortage in the Army be continued in an assignment which does not make full use of these abilities. (Change 3, AR 615-28). However an enlisted man will be transferred only for the convenience of the government. Transfers will not be made solely for the convenience of the enlisted man or his family (War Dept. Cir. 308, 1942).

Q. Can an enlisted man be sent back to the United States from overseas for aviation cadet training?

A. Yes. He may apply for such training through normal channels if he is between the ages of 18 and 26 inclusive and is physically qualified. (Note: Men overseas can also apply for officer candidate training.)

☆ ☆ ☆

Q. Is there a standard WD form for maintaining a record of an officer's accrued leave?

A. No. WD Circ. 55, 1943, provides that "for the duration of the present war and six months immediately thereafter, personal certificates of officers attesting to the amount of their accrued leave will be accepted for all purposes without other supporting evidence." However, to have available the necessary information, officers should keep copies of their orders granting leave.

Q. Can the produce from victory gardens on bases be sold in town?

A. No. Food so produced will be for the consumption of military personnel only and not for sale to civilians. (WD Circ. 83, 1943.)

☆ ☆ ☆

Q. Can an enlisted man still deposit surplus funds with any disbursing officer?

A. Yes. He will receive four percent interest on all deposits. AR 35-2600.

☆ INSPECTING THE INSPECTOR

How much of your time are you devoting to actual inspections in the field? Ninety percent is not too much. . . . Command octivities function on o 24-hour basis, which means all checks cannot be made between 8 a.m. ond 5 p.m.

☆ ☆ ☆

Hove you rechecked recently steps taken to conserve gosoline and rubber?

☆ ☆ ☆

Are you contocting enlisted men? Many octivities requiring correction con be discovered by doing so.

☆ ☆ ☆

Do combot crews understond thoroughly the use ond operation of life soving equipment ond procedure to be followed when forced down at seo?

☆ ☆ ☆

When an inspection reveols lack of equipment, are you occepting the onswer "o requisition was submitted way bock when"? You should check to see whether follow-ups hove been mode.

☆ ☆ ☆

Has compliance been made with WD Circ. 118, 1943, pertoining to the disposition of ration sovings funds?

☆ ☆ ☆

Are you being instructive? Helpful? Or just criticol?

Extra Spectacles

Many men are preparing for overseas movement without extra glasses. Action to obtain these spectacles should be taken long before the men reach their final phase of training.

WD Pamphlet No. 8-5, May 11, 1943, consolidates all previous directives on the issuance of spectacles, and provides, substantially, that enlisted men will be issued two pair of glasses if authorized, as soon as possible after date of induction. This issuance will be made at the home station without regard to movement overseas.

Due to a temporary shortage of spectacles, WD Circ. 131, 1943, sets up a priority system for obtaining glasses. Numbers 1 and 2 represent the cases where glasses are more urgently needed. Number 3 may be used, for instance, for personnel in the earlier periods of their basic training, and Number 4 for limited service men or other personnel more or less permanently assigned to stations in this country.

The most important consideration is to submit requisitions now. Don't wait until those last busy weeks before the boat sails or the plane takes off for parts unknown.

Good Shooting Takes Practice

When we talk about the need for good shooting, remember we are not only discussing the men behind the guns in planes, but also the thousands of AAF ground soldiers (officers and enlisted men) who are armed. POM inspectors call particular attention to an AAF directive which states that all men will fire the prescribed course for the weapon they carry before being transferred to a staging area or port of embarkation for movement overseas. Responsibility rests on the unit commander. (Note to base administrative inspectors: If the completion of the range on a new base has been unduly delayed, is anyone training his sights on the bottlenecks?)

Think Before You Print

Those overworked mimeograph machines in field headquarters are due for a little time off. An effort is being made throughout the Army Air Forces to reduce field printing and reproduction of forms, manuals, pamphlets, charts, orders and instructions, unless they are directly essential—not merely supplementary—to the prosecution of the war or the conduct of official business.

Inspectors too often forget to look into that room where the Army's version of a "printer's devil" works and see what he is grinding out. Is it important? Is it essential?

This is not intended to lessen or hamper the efficiency of any AAF installation or activity to any degree, but it is desirable for each commanding officer to check on reproduction work and make certain that it is really needed.

Portable Lights Working?

Take a tip from technical field inspectors and check your portable field lighting equipment. It may — or may not — be ready for emergency use. Get requisitions in for shortages now.

Obligation to Officer Candidates

It is a bright day for the officer candidate when he receives his acceptance to a school, but a low ceiling forms when he notices that his organization is treating him like an old fire horse that has been put out to pasture. If you are his CO, your obligations to him do not cease until the day the morning report shows his transfer. If he is going to a school of another arm or service, he needs your help more than ever.

Many AAF enlisted men are being eliminated from these schools because they have not had sufficient basic training of the type given by the other arms and services. Air Corps enlisted men normally receive less basic training than the men with whom they will be competing. All candidates from the AAF should be given an opportunity to take basic training which will help them *prepare for inspection* in their school. (Letter, Headquarters AAF, June 2, 1943.)

About That Morning Report

You don't know how to keep a morning report, sergeant, unless you know how to reconcile the entries. And how about you squadron commanders—do you know how to verify the entries?

Prepare for Combat

In actual combat, a Nazi or Jap will be checking up to find out how well you have heeded the advice of your tactical inspector during training days. Below are some of the points, bearing the seal of approval of overseas combatants, which your inspector will emphasize to get you in the best possible fighting shape to meet the enemy:

Pilot and co-pilot, are you getting in sufficient hours of blind instrument flying?

Navigator, do you know how to check drift reading?

Bombardier, can you run through a good flight pre-check of your bombsight?

Radio operators, can you perform emergency maintenance in flight? Is the interphone system working — have you checked it immediately *after* getting into the air as well as *before*?

Aerial engineer, has your ship been correctly serviced? Is the oxygen equipment in shape? Have you checked *all* engines?

Gunners, how's your marksmanship? ☆

AIRDROME CONSTRUCTION IN NORTH AFRICA

(Continued from page 16)

begin with a permanent, all-weather paved field at Agadir, some 250 miles down the coast from Casablanca, below the high Atlas mountains. We have a paved field at Sale, just north of Rabat, which is the capital of French Morocco. We have a paved field at Port Lyautey. The only other field with concrete runways in North Africa is the permanent airdrome at Bizerte which the Germans didn't have time to destroy.

Probably of greatest interest is the story of the airdrome at Bone because it is typical of the Coastal problem and also because it is particularly interesting from an engineer's standpoint.

Bone airdrome is built on the silt which has been dumped there through the centuries by the Seybouse River. This river empties into the Mediterranean in the small gulf where Bone is located. We knew the earth there was nothing but pure gray silt mud because we had seen the craters of several 1,000-pound bombs showing pure clay down some eighteen feet. As a result, every time it rained, Bone became unserviceable, thereby making it very difficult to furnish air cover for the port of Bone—the most important forward port east of Algiers. For a long while Algiers was the most easterly port at which large ships would put in. The British Navy finally consented to carrying on as far as Bone, provided we would furnish adequate cover.

In five days we built an emergency field ten miles west of Bone, known as Tingley, by using a steel runway mat on a small bit of sand we were fortunate enough to find. We knew it wouldn't fill the bill permanently since it was in the mountains and unsuitable for night fighters.

We were asked to finish a suitable airdrome for all-weather operations within two weeks. The only way we could make it operative was to use sand, which was amply available in huge coast dunes. These dunes, however, were on the far side of the Seybouse River, thus posing a major river-crossing problem. In addition, it was raining and we couldn't send any transports out on this mud flat.

We dispatched a battalion of aviation engineers to the site and gave them all the heavy earth-moving equipment in North Africa — turnapulls, twelve- and sixteen-yard pan scrapers with tractors, and all the one-and-a-half-ton dump trucks we could lay our hands on. Then we had the job of getting across the Seybouse River. We accomplished this by starting with the sand from the dunes and building a road ahead to carry us to the Seybouse River. We then bulldozed a causeway across the river and carried our sand by road a mile and a half to the site of the runway.

We figured it would take five days to cross the Seybouse and finish the road, and that we could lay the sand for the runway in the remaining nine days—provided we didn't get rain, which would wash away the small amount of sand we could afford to put on the road. Or worse, it might raise the Seybouse and wash out our causeway.

Luckily, we didn't have a drop of rain for two weeks. We built the road and causeway, moved 66,000 yards of sand to the Bone site and built the runway. The sand mat varied from 36 to 48 inches in thickness over a width of approximately 150 feet. As we got the sand in, we followed with the steel plank. On the afternoon of the fourteenth day, we put in the last load of sand and laid the last few pieces of plank to finish the runway. That evening we had a cloudburst. The rain raised the river and later we had major repairs to make to the causeway, but the runway was in and it stayed put.

DURING construction the airdrome was bombed by the Germans two or three times with 1,000-pound bombs. Twice they missed the runway by approximately fifty feet. All we had to do was to scrape the mud off the strip. The battalion also had its camp site bombed. They felt they were veterans. But, to my mind, the thing that pleased them most was what this particular runway meant to a certain crew that came in one afternoon shortly after we had finished it. A medium bomber had been out on a strike and came back over the mountains in a thunderstorm. The pilot had practically no gas left, nor did he know where he was. He didn't know where there was an airdrome in the vicinity either, so he decided the best thing to do was fly straight north until he reached the sea where he knew, because he had done it once before, that he could crash-land his ship and save his crew.

He flew north, reached the Mediterranean and then turned west. He was just sitting upstairs waiting for his gas to run out when a member of his crew shook him and told him to look down. There was the longest runway he had seen in North Africa. He made one sharp circle and landed on it. The plane didn't have enough gas left to taxi off the runway.

A few days before I started back to the States, I went up to Bone and found it had become the refuge for every type of craft which had to have a place to land in a hurry. I don't think there is a type of Allied ship which was not represented there. In order to help save the runway and also because it was easier on the ships, we built a "belly-landing" strip alongside the runway and invited everybody who came in with his landing gear knocked out to use it.

Our airdrome construction program in North Africa consisted principally in the building of runways and dispersal areas. We built very few revetments. In the first place, we did not have the materials or manpower with which to do the job, had we wanted to. Moreover, the German bombing was not sufficient to require revetments. It is my opinion that the Germans themselves put more effort into this work than it was worth, for in virtually every revetted pen of the enemy's airdromes you could find planes that had been successfully strafed and burned.

We believed that the most efficient method of protecting aircraft was to build individual hard standings for dispersal on the fields or to construct one very large surfaced area on which planes could be dispersed according to a squadron commander's own desires. This worked out very well in practice and saved a vast amount of time and effort.

As it was, plenty of effort was needed on the forward fields for defensive works, of which the well-known slit trench, a ready refuge when enemy planes came over, was the most common variety. At first, some of these fields relied entirely for ground defenses on the .50-caliber machine guns and anti-tank guns of our aviation engineer battalions

This story of the aviation engineers with the Northwest African Air Force is not complete without mention of the headquarters and topographic companies which formed an essential part of the team. The headquarters companies undertook airfield reconnaissance and survey, and general air force camouflage work.

The topographic companies compiled and reproduced target and flak charts essential to air force operations. These units demonstrated in their work the unflagging zeal and devotion to duty which characterized all of the aviation engineers in Northwest Africa. ☆

A bulldozer and "sheep's-foot" roller ready for double duty.

AIR FORCE OPERATIONS IN THE BATTLE OF Attu

P-38 makes a wet landing after raid on Attu.

By Brig. Gen. William E. Lynd

Army Air Officer on the Staff of the Commander in Chief of the Pacific Fleet

One of the principal challenges facing American forces in the Battle of Attu—almost as great as the challenge offered by the enemy itself—was the effective coordination of air, sea and ground elements in the face of severe handicaps encountered in the weather and terrain.

The Army and Navy air forces had a task to perform in complete cooperation with the attacking ground troops, and the success with which their missions were carried out is a tribute not only to those responsible for the carefully laid plans of the Attu operation but to the men who kept the planes in the air under almost impossible flying conditions.

Army Air Force operations in the engagement were carried out by the Bomber and Fighter Commands of the 11th Air Force from the recently constructed air base on Amchitka under the direct control of the Task Force Commander. Army and Navy aircraft operated in close conjunction during the entire engagement.

AAF planes participating over Attu included B-24s, B-25s and P-38s. The close, low-level support of ground troops was primarily the function of P-38s employing dive-bombing and strafing tactics. The B-24s and B-25s were used to bomb specific enemy concentrations and, in some cases, to drop supplies to ground troops from the air. P-40s based on Amchitka were used primarily in local defense and to destroy enemy aircraft on Kiska, which lies almost astride the Amchitka-Attu run. The type of Navy aircraft employed was that best suited for an operation of this nature.

When the attacking ground forces stormed Attu from Navy-launched barges on the morning of May 11, they advanced under cover of a fog so thick that men had to be lowered by their heels over the sides of the barges to guide them through the rocky waters approaching some of the landing beaches. But while the ground troops were aided, air operations were severely hampered by this thick overcast.

The fog on the first day was merely a sample of the weather which made air operations extremely difficult during the entire action. Even the distance of 300 miles between the air base at Amchitka and the targets on Attu made every difference in the world. Time and again, bombers and fighters left Amchitka under clear skies only to find Attu completely fog-bound. On other occasions, ground commanders saw clear weather under the overcast at Attu and watched in vain for supporting aircraft which were grounded by impossible weather at Amchitka.

Nevertheless our bombers and fighters did get through to deal severe blows to enemy positions. Missions were undertaken whenever there was the slightest chance of their successful completion. Frequently, when AAF bombers were unable to get through to Attu, they would return over Kiska and release their bombs on enemy installations on that island.

Seldom did the bombers find a hole in the Attu overcast through which their target could be sighted and their bombs dropped. In most instances they had the opportunity to make bombing runs only when the fog lifted sufficiently to permit them to get under it safely.

It might well be pointed out that despite these handicaps to air operations, there is no known instance of American aircraft hitting our own troops from the air or our troops firing on our own planes from the ground.

Perhaps the most disappointed of the

airmen participating in the Attu operation were the gunners aboard the bombers. Except for the very rare occasions when they had a chance to warm up their guns against enemy ground troops, all they did was wish for enemy fighters that never appeared.

Jap aircraft finally attempted to relieve their besieged forces on the eleventh and twelfth days of the American operations but both attacks failed completely. On May 22, twelve or fifteen twin-engine bombers attacked a destroyer and a gunboat patrolling in the vicinity of Holtz Bay on the north side of Attu but no damage or casualties resulted. One bomber was shot down by anti-aircraft fire.

On the following day, sixteen planes of the same type attempted to bomb American troops on Attu but they were intercepted by five P-38s at about 14,000 feet, well above the overcast. The enemy planes jettisoned their bombs and attempted to escape our fighters. Four of the bombers were shot down in flames, another dropped into the overcast definitely out of control and seven others were seen to go down smoking heavily. Only four of the original sixteen were observed heading west after the engagement. One P-38 was missing and another was shot down but the pilot was rescued.

As of May 24, AAF losses in the Battle of Attu totaled two B-24s, one B-25 and four P-38s. The P-38 Lightnings had definitely proved themselves to be the most effective type of fighter aircraft available to use under such operating conditions and at such distances. The feat of the P-38s in intercepting the enemy bombers 300 miles from their base on Amchitka was significant in this regard.

Actually, the role played by the AAF

Despite the "worst weather in the world," the air arms of the Army and Navy played a prominent role in this first Aleutians offensive.

in the Attu operation began days before the assault troops established beachheads on the island. It was the air job to soften the Jap shore installations by bombing and low-level strafing, and to determine by thorough reconnaissance the most advantageous points at which to land an adequate striking force.

Although the Japs on Attu had no fighters for bomber interception, their anti-aircraft fire was relatively heavy and exceptionally accurate. As a result, formation flying was not needed from a protective standpoint, and by flying individually AAF planes were able to divert and scatter enemy ground fire. In this same connection, area bombing was undesirable and point bombing proved to be the only method of accomplishing the job.

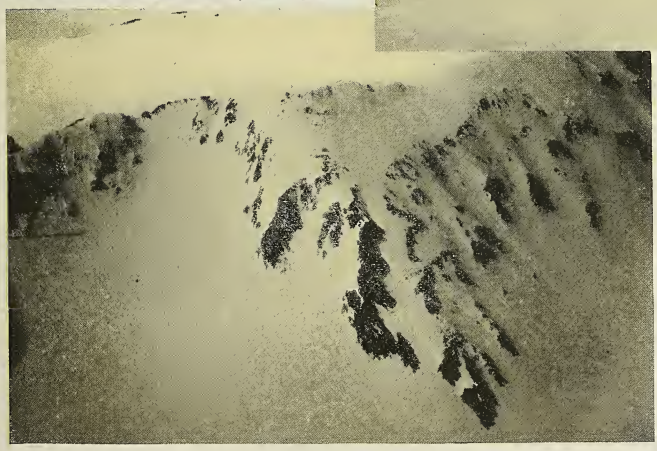
An opportunity for me to observe this phase of AAF operations at first hand came six days before American troops landed on Attu. Six B-24s took off from Amchitka to bomb enemy installations in Chichagof Harbor and in the east and west arms of Holtz Bay. I was the command pilot of one of the two Liberators assigned to bomb two anti-aircraft batteries in the harbor. As we approached the objective and went in for our bombing run, the Jap batteries opened up. Although their fire was accurate and some hits were scored, the damage was negligible. They continued to concentrate on us after we had completed our run, permitting the second B-24 to come in for an accurate crack at the target unmolested.

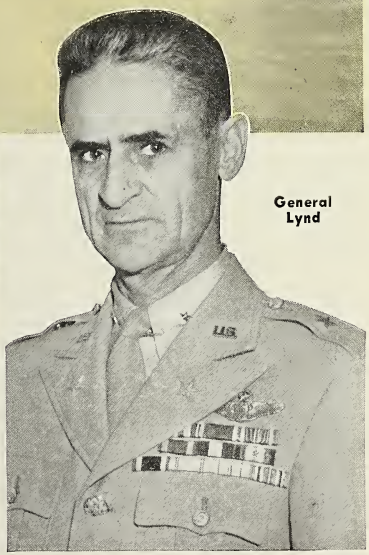
Despite the adverse weather conditions, one command plane flew from Amchitka to Attu every day while the battle was in progress. Its pilot was Colonel William O. Eareckson, deputy chief of the Air Staff in Alaska and air officer for the Attu Task Force Commander. I rode in his plane for the first five days of the campaign, and no tribute I could pay to this officer would measure up to the skill and efficiency he displayed in carrying out one hazardous aerial mission after another. His B-24 was in the air over Attu from eight to ten hours out of every twenty-four. Direct contact was maintained between his ship and the Task Force Commander, enabling ground troops to take advantage almost immediately of battle trends noted from the air by Colonel Eareckson and members of his crew.

(Continued on Page 55)

Here is a typical cloud blanket, almost covering 3,500-foot peaks, with which our airmen had to contend.

Our B-24s banked into steep-walled ravines such as this to strafe Jap ground troops. This and photo at right taken by Gen. Lynd.





General Lynd

A DUCK For Our Air Fleet

By Lieut. Henry G. Pearson
Wright Field

The amphibious C-47 in flight.

LARGE amphibious floats have been attached to the Army Air Forces' C-47, thereby opening the way to new and important uses for this workhorse of the air transport system.

By adding this flotation equipment, Materiel Command engineers have converted the C-47—military version of the familiar commercial DC-3—into a plane which can land on water, taxi to the shore and climb out on dry land under its own power. Successful tests already have been made on Long Island Sound, and additional testing is being continued at Wright Field.

The need for such a ship has become more and more apparent as a result of the difficulties encountered in rescuing AAF pilots forced down at sea in the South Pacific and washed up on tiny coral reefs and islands. The amphibious plane will be able to take off from a land base, set down on the water nearby the island and then, by lowering its wheels, climb onto a beach to load passengers and equipment. Engineers foresee in the amphibious C-47 the ideal answer to the rescue problem.

Another function of the new amphibian may prove to be the landing of this type of plane on snow and ice in Arctic climes. Such landings on amphibious floats have been made successfully, and further experiments next winter may show the amphibious C-47 to be suitable for this purpose.

According to Wright Field engineers, the floats attached to the C-47 are among the largest of their kind ever built. They are over 41 feet long, five feet high and have a maximum width of five feet. The German Blohm and Vose 139 had larger floats but they were not amphibious.

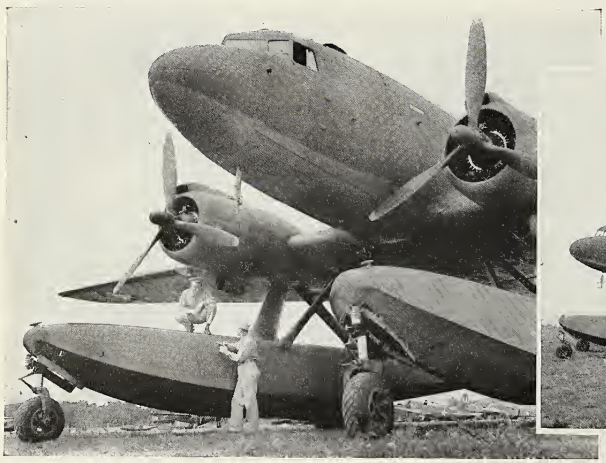
The difference in the handling of the C-47 as a result of the modification is relatively minor. The plane's center of gravity has been moved forward slightly, and landings are accomplished in much the same manner as in a ship with tricycle landing gear. The load limit is not appreciably affected but the speed has been reduced by the extra weight and drag.

A few modifications in the fuselage were necessary in order to attach the floats. The wheels on the floats retract in the same manner as the wheels on the ordinary C-47. Small water rudders, located on the rear of each of the pontoons, are lowered when the plane is landed on water. They are operated from the brake pedal and are retracted by a device which is attached to the tailwheel lock.

More recent designs of the amphibious C-47 have utilized the center bulkhead of each pontoon as an auxiliary fuel tank capable of carrying 300 gallons. With the 600 gallons of extra fuel, the range of the airplane is greatly extended.

A limited number of these amphibians are expected to be put into service within the next few months.

The pictures below show the comparative size of the C-47's floats.



Flak Suits—Bullet-Proof Vests of the Air

By Lieut. Robert V. Guelich

Flak suits for combat crews today are protecting the lives of hundreds of AAF men who have been flying through clouds of bursting anti-aircraft shells over heavily defended enemy positions.

Because fragments of exploding ack-ack shells too often have made it necessary to hospitalize much-needed crew members, special armored vests were developed in England. Now, many of our crew members are wearing infantry helmets and flexible armor suits from the neck to the hips, with a sporran (apron) protecting the thighs. This armor has proved effective in repelling ack-ack and 20 mm shell fragments—protection that has greatly reduced the number of casualties in bombing missions.

Through the work of Col. M. C. Grow, 8th Air Force Flight Surgeon, sixteen-pound flak suits were developed because they could be carried around at high altitudes without exhausting the crew members. These suits proved their worth on ten heavy bomber crews who first tried out the suits of mail. Scores of injuries and many deaths definitely were prevented.

For example, Lieut. Jack Fischer, B-17 bombardier, was on a mission over Europe on May 21 when a 20 mm cannon shell exploded 18 to 24 inches from his chest. Although numerous small wounds in the right arm made hospitalization necessary, several large fragments that might have caused fatal injuries were stopped by the armored vest. Lieutenant Fischer suffered no wounds on the part of his body covered by the vest.

The suits have proved so successful and acceptable to combat crews that British establishments are swamped with orders for them and American manufacturers have been called in on production contracts.

At the Armament and Equipment Laboratories of Wright Field, special steel and plastic suits of armor have been tested to determine what materials will offer maximum protection at a minimum weight.

Types under study include riveted and cemented overlapping steel strips (approximately 2½ by 18 inches), overlapping two-inch squares of 20 gauge manganese steel, and solid breastplates. Canvas is sewed on both front and back of each section. The complete vest is hung on the shoulders and can be dropped off in an emergency by pulling one string.

In the North African campaign many pilots and crew members salvaged armor plate from wrecked planes which they wired around the vulnerable spots of their positions. This makeshift protection often stopped fragments that could have resulted in injuries.

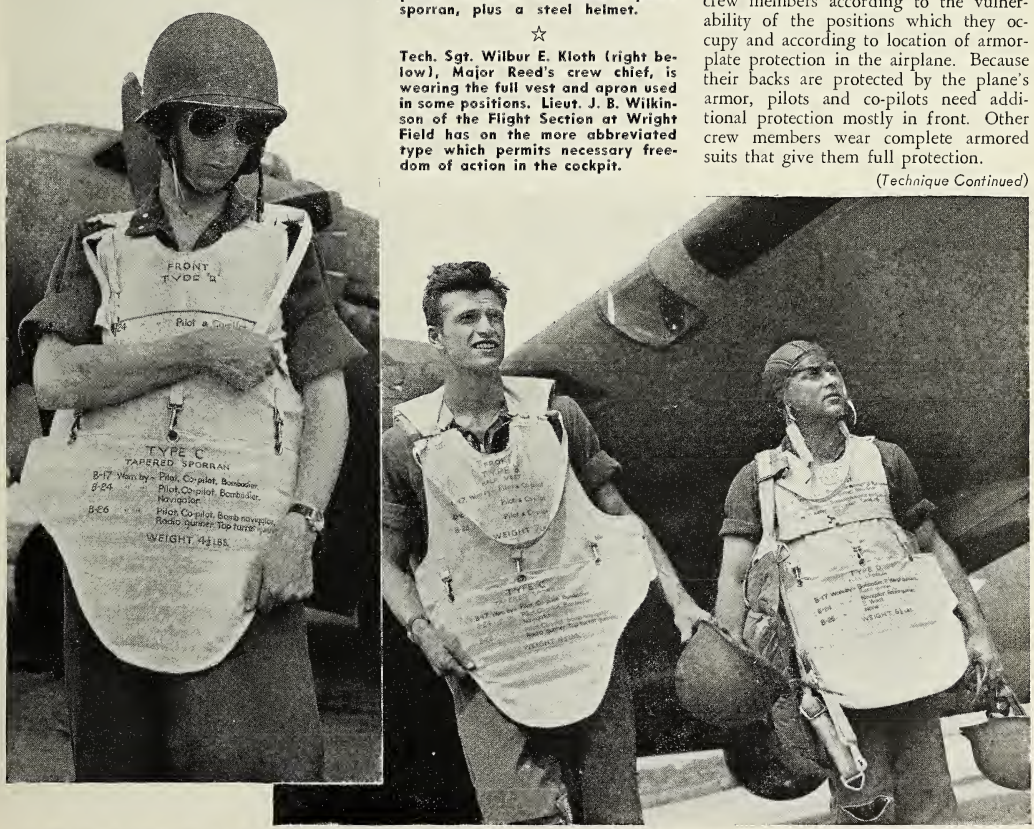
The new armored vests are adapted to crew members according to the vulnerability of the positions which they occupy and according to location of armor-plate protection in the airplane. Because their backs are protected by the plane's armor, pilots and co-pilots need additional protection mostly in front. Other crew members wear complete armored suits that give them full protection.

(Technique Continued)

Maj. Robert J. Reed (left) of the Eighth Bomber Command dons the protective flak vest and tapered sporran, plus a steel helmet.

☆

Tech. Sgt. Wilbur E. Kloth (right below), Major Reed's crew chief, is wearing the full vest and apron used in some positions. Lieut. J. B. Wilkinson of the Flight Section at Wright Field has on the more abbreviated type which permits necessary freedom of action in the cockpit.



TECHNIQUE

Over a Utah highway en route to an airbase goes a B-17 mobile training unit of the Fourth District, AAF Technical Training Command.

Mechanical Training by Trailers

An innovation feature of the Army Air Forces Technical Training Command is a mobile training unit for visual and practical mechanical instruction. Big, van-like vehicles bring the vital inner-workings of fighting planes to aircraft mechanics on the line. The plan originated in the Fourth District of the TTC and now all Districts have similar units on the road.

To liken it to a travelling classroom is to underestimate its work. Open its stage-like doors, scan its interior and you find a complete mock-up panel system of the mechanisms of a combat plane. Every type used in the AAF is represented by a mobile unit that keeps its instructional setup in equipment and modification constantly up-to-the-minute.

Successful from the outset, the system has mushroomed considerably. Last summer the first unit was established for the P-38. Today mobile units are touring the entire country to service the tactical air forces.

For example, in a B-17 trailer unit, there is a complete cockpit assembly up front with controls and instruments that actually work and can be observed in any operation. A cut-away B-17 engine bares every essential part to close scrutiny, and a cross-sectioned propeller is exhibited in a conspicuous corner.

Nearby, mock-up panels show the construction of the plane's airframe and the operation of its hydraulic and cooling systems. Another panel illustrates the strategic arrangement for fire control apparatus that prevents the spread of a blaze set by enemy shells. Still another panel traces the entire wiring system of the ship enabling the mechanic to follow each minute wire in the circuit.

Technical construction of the aircraft supercharger and other engine accessories is revealed by actual cut-away equipment parts and even a life-sized oxygen system is carried along for instruction purposes.

A motion picture projector brings the Technical Training Command's latest training films to the attention of the ground crews.

Most of the instructional material is angled towards the aircraft mechanic, but other AAF technicians, particularly armorers, are also kept abreast of the latest developments in their specialties. Modifications on aerial machine guns and cannon are brought to the attention of the men who service them at their tactical stations.

The compact interior of the mobile unit contains all the intricate mechanisms of the battle plane it serves.

Co-founders of the system were Maj.

Arriving at its destination it drives right onto the line to display in panel form the "works" of a B-17 to the mechanics who service the planes.

Gen. Walter R. Weaver, Commanding General of the TTC and Maj. Gen. John F. Curry, head of the command's Fourth District. Both were not satisfied with mere classroom and factory instruction. Once out on the line, they held that the men must be further schooled in the practical application of what they had learned and kept conscious of the latest developments.

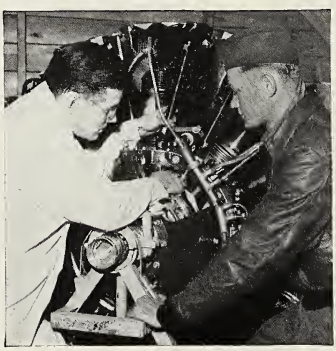
Then, too, they knew that the planes used in tactical units were not readily available for instruction purposes. These planes might be kept from the hangar for days, perhaps longer, and when they did return to their hangars the fast maintenance necessary to put them back in the air as soon as possible eliminated the possibility of any further mechanical training.

The answer was the development of a mobile unit designed to bring to the aircraft technician on the line all the facts about the plane he was servicing. It was practical application of the knowledge he had learned in a technical school and by means of actual visual instruction he would be better equipped to diagnose the ills of an ailing craft and cure them with speed and assurance.

Each truck trailer unit is staffed by an officer in charge, six non-commissioned instructors, an Army driver and one or two civilian specialists. The soldier-instructors are usually graduates of a TTC school and experienced hands in machinery. Civilian specialists are from the aircraft factories whose planes are represented by mobile units.

"The Mobile Training Unit is a good deal more valuable for its purpose than the technical classroom," says Lieut. Col. Thomas E. O'Connell, in charge of the Fourth District Mobile Training Units. "When line mechanics can see and familiarize themselves with the vital mechanisms for the plane's maintenance they will grasp the fundamental idea of what to do and how to do it faster and more thoroughly." — **Staff Sergeant Jack Angell, Public Relations Office, Headquarters Fourth District, AAFTTC, Denver.**

Inside the trailer a cut-away B-17 Cyclone engine reveals its working mechanism to an onlooking mechanic.



Cable Tightener

Staff Sgt. Norman Wolfley of Allansville, Pa., has simplified the work on the engines of AT-11 bombardier training planes at the Victorville (Calif.) Army Flying School through a new way of adjusting cables on the engine control. He developed a new instrument (shown above) which is a combination socket wrench and pliers. It tightens cables accurately and easily. — **PRO, WCAFTC, Santa Ana, Calif.**

Individual Light for Code

Formerly visual code instruction signals were given to aviation cadets at the Enid Army Flying School by a large light in each corner of the code room. They had to glance at a light in a corner, then look down at their paper to print the letter.

Under a new arrangement, each code booth now has a radio pilot light in the center only a couple of inches from the cadet's paper when he is receiving the visual code, enabling him to watch both the light and the paper with a minimum amount of eye movement.

Mr. W. B. Teitzel, instructor, states that the new system allows the average cadet to receive from one to two words faster per minute. — **PRO, Enid Army Flying School, Okla.**

Safety Device for Tire Inflation

Not long ago a man was killed at Tinker Field while inflating the tire of a bomber. Recently his fellow workers put into operation a new device which will allow the pumping up of an airplane tire to be done in safety.

General plans of the device include a metal bin made of boiler plates into which the tire is rolled for inflation. Through an opening in the side of the bin the tire can be blown up to its proper pressure from a regular air hose. Attached to the top of bin is an air regulator which automatically allows a maximum amount of air to enter the tire. Gauges attached to the air hose register the amount of air in the tire at any particular time and the other one shows the maximum pressure of the control gauge setting. A red light flashes while the tire is being inflated.

The idea was advanced by Miles J. Smart, foreman aircraft mechanic in the Landing Gear Installation department, who passed his designs on to Winfield Smith, foreman of the welding section. The pair turned their invention over to Tinker Field, where it is now in use. — **Tinker Field, Okla.**

Combat's Child—C3-1B Crane

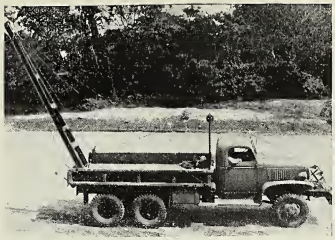
On arriving at an island in the South Pacific, the 40th Service Squadron of the 13th Air Force found itself minus a C-2 wrecker or its counterpart, so the engineering section set to work and evolved a crane assembly from a meager supply of parts—mainly salvage—that would do such work as picking up engines, wings and fuselages, and other tasks which occur in the normal course of aircraft repair work.

Two non-commissioned officers, Master Sgt. Gerald V. Eady, Decatur, Ind., and Tech. Sgt. Jack R. Sowers, Rockwell, N. C., working under the direction of First Lieut. Reuben Yarri, Shreveport, La., developed after two modifications a crane since designated the C3-1B, which has proved very successful. The crane consists of an "A" frame-boom constructed of six-inch by one-quarter-inch channel iron. The frame is bolted to the rear of the bed of a two and one-half ton truck equipped with a power take-off winch. The "A" frame is sixteen feet long with a two-foot base and is welded throughout. Lifting power is derived from the power take-off winch at the front of the truck. The cable is passed by a series of pulleys over the cab to the base of the boom, then to an eight-inch pulley at the top of the boom to the load which is picked up either by cables or a hook.

Loads weighing as much as two tons have been picked up with the C3-1B crane but it is not advisable for steady use to lift loads greater than 2,500 pounds, it was found. However, this weight limit permits its use for all aircraft engines, most wings and other aircraft accessories.

Although designed primarily for use while waiting the arrival of a C-2 wrecker, the crane assembly is not replaced by the wrecker. On the other hand, it is a very useful adjunct to the C-2 wrecker, for example in the lifting of B-17 wing inner panels or in picking up a B-17 fuselage. Working together, the two pieces of equipment do such jobs easily.

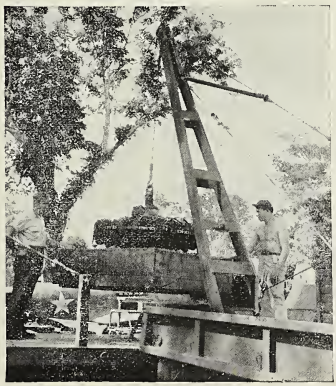
Should the designation "C3-1B" appear strange to those familiar with stock lists, here's the explanation for it. The letter "C" indicates crane, the figure "3" was so used because this was the third one made; the "1" represents the "A" frame which is the same as the original, and the letter "B" stands for the second modification made on the present crane. — **Lieut. Col. Franklin K. Reyher.**



The C3-1B crane, pictured at its birthplace on a South Pacific island.

Lifting a fuselage.

Hoisting an engine.



Artificial Icing in Flight

There was a time when research projects involving test flights in natural icing conditions rarely could be completed on schedule because icing areas are strictly will-o-the-wisps, easy to locate only when you're trying to evade them. Now by the flip of a switch, ice formations can be produced on prop blades during flight.

Wright Field propeller engineers, with a series of anti-icing and de-icing projects coming up, resolved to work out a method by which prop blades could be exposed to icing in flight tests whenever needed.

In one arrangement a special spray was installed in the tail turret of a B-24. Water from two large tanks in the bomb bay is pumped through the nozzle as the B-24 flies in front of the plane being flight-tested. At the right altitude ice forms on the plane trailing in the spray.

In the alternate scheme a single plane is employed. Here an outrigger spray was built which throws moisture from bomb bay tanks into the No. 2 propeller of the B-24 in which it was installed.

To obtain motion pictures of the propeller while it is icing up and throwing off ice during flight tests, the Motion Picture Branch assisted in solving several problems. Propeller engineers prescribed that only one blade be photographed in identically the same position during each revolution at a speed which would result in a sharp image.

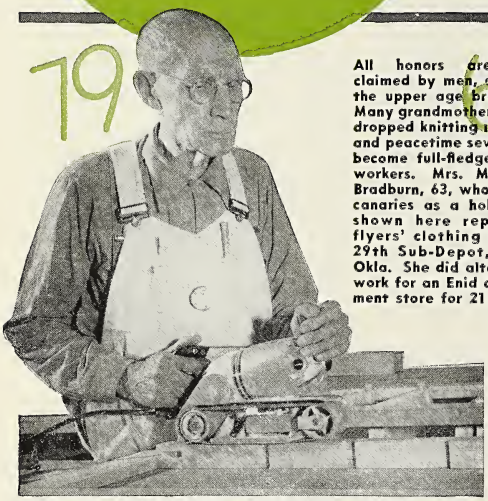
This stroboscopic effect was secured by synchronizing the shutter speed of the camera with the rpm of the propeller, thus showing successive stages of icing and de-icing.

It was a tough job but the resulting motion pictures show the pattern and speed of ice building up and being thrown off of the prop during flight. — **Arden R. Strang, Wright Field.** ☆

AS YOUNG AS THEY FEEL

THOSE who think of this war only in terms of youth and the present generation forget the thousands of men and women who, though they may have reached their three score years and ten, still have the skilled hands and youthful outlook needed for dozens of tasks which must be done to insure the successful prosecution of the conflict. Many of these young-oldsters have taken their talents into AAF depots and sub-depots throughout the country. They not only are performing their duties well but, more important, they are relieving younger men and women for service where youth in years—and the stamina that goes with it—is a prime essential. Many of these older war workers have left the ease of retirement to share in the fight against our enemies. Some of them are literally backing up their grandchildren who are pilots and mechanics, weather officers and mess sergeants. They have turned again to the lathe, the forge, the saw and the hammer to perform tasks that are just as vital as dropping bombs on Axis factories or building airdromes in the jungle. AIR FORCE presents this picture story of a representative few of the thousands of these men and women who are contributing so effectively to the Army Air Forces' and the nation's war effort.

79



Six years ago, A. J. Bruce was retired after a half century as carpenter for Santa Fe Railway. Today, at 79, he works the swing shift at the San Bernardino (Calif.) Army Air Depot.

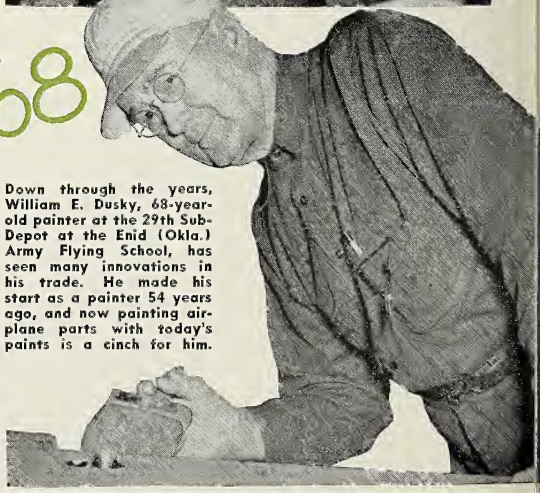
63

All honors are not claimed by men, even in the upper age brackets. Many grandmothers have dropped knitting needles and peacetime sewing to become full-fledged war workers. Mrs. Myra E. Bradburn, 63, who raises canaries as a hobby, is shown here repairing flyers' clothing at the 29th Sub-Depot, Enid, Okla. She did alteration work for an Enid department store for 21 years.

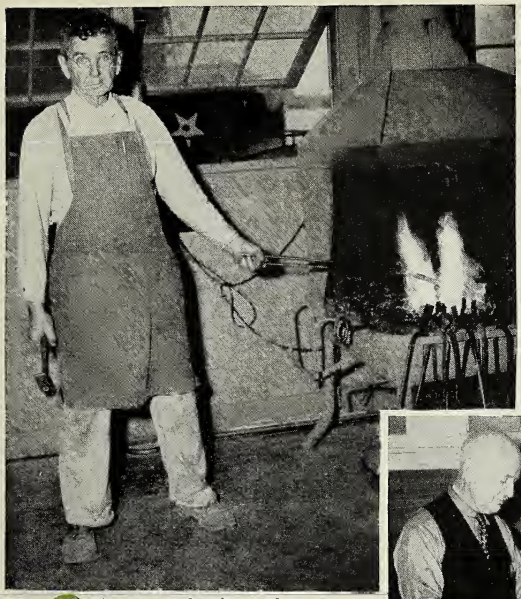
73

Despite his 73 years, Alfred M. Frothingham commutes daily from Detroit to his job as mechanic and blacksmith at the 96th Sub-Depot, Selfridge Field, Mich. In his earlier years, Mr. Frothingham was engaged in vaudeville and blacksmithing, except for his five years in the Army from 1916 to 1921.

68

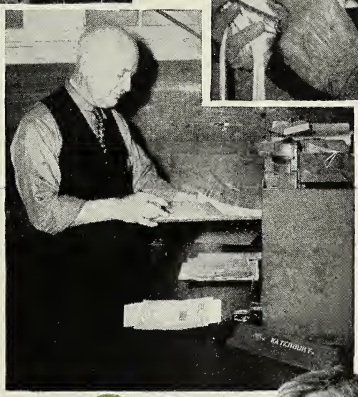


Down through the years, William E. Dusky, 68-year-old painter at the 29th Sub-Depot at the Enid (Okla.) Army Flying School, has seen many innovations in his trade. He made his start as a painter 54 years ago, and now painting airplane parts with today's paints is a cinch for him.



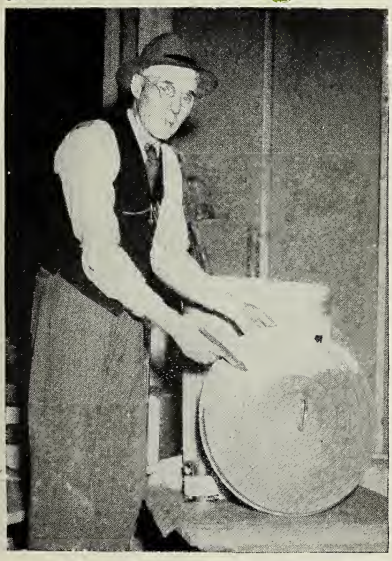
After a lifetime spent farming and operating a blacksmith shop, John C. "Uncle Bill" Denham, 69, works at the 9th Sub-Depot, Harding Field, La. He has two sons and one grandson in the armed forces.

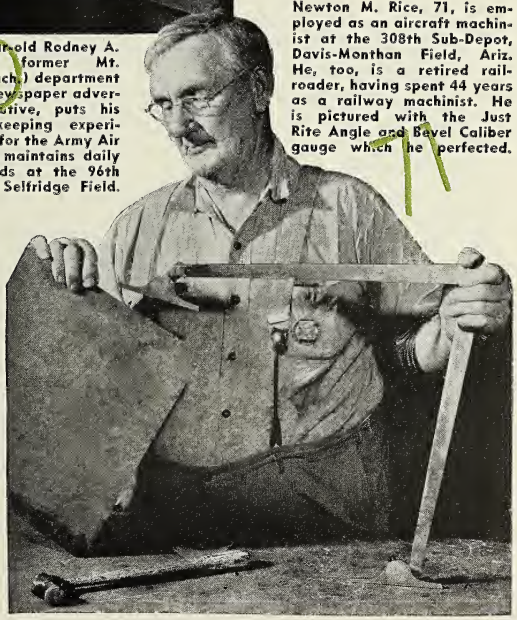
Seventy-year-old Charles E. Baldwin as a parachute jumper (from balloons) at the age of seventeen, was billed as "Professor Baldwin, King of the Air." Now a driver at headquarters of the 40th Sub-Depot, Buckley Field, Colo., Mr. Baldwin takes time out to inspect modern chutes and reminisce. He once performed with Ringling Brothers, Barnum and Bailey Circus.



Seventy-year-old Rodney A. Waterbury, former Mt. Clemens (Mich.) department store and newspaper advertising executive, puts his long bookkeeping experience to use for the Army Air Forces. He maintains daily stock records at the 96th Sub-Depot, Selfridge Field.

After retiring in 1941 as terminal agent of the Canadian Pacific Railroad, Francis Dow, 68, has returned to "active duty" as a packer in the shipping department of the 46th Sub-Depot at Houlton, Maine. He has one son in the armed forces in Africa.

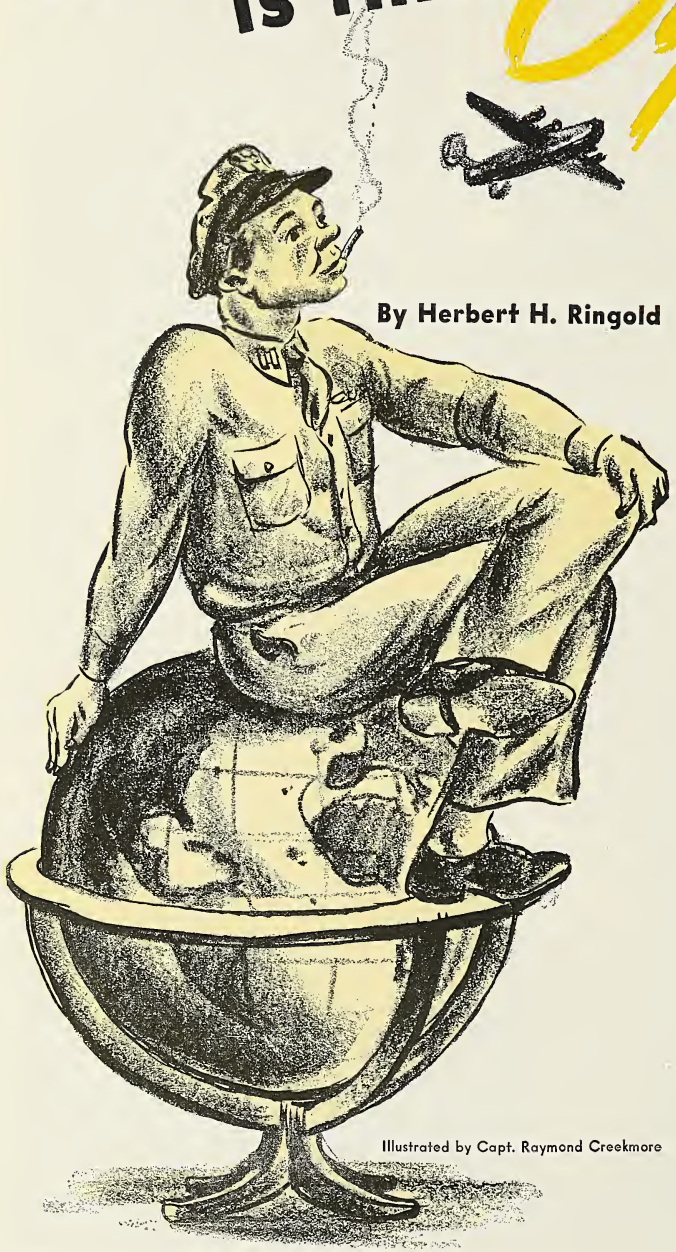




Newton M. Rice, 71, is employed as an aircraft machinist at the 308th Sub-Depot, Davis-Monthan Field, Ariz. He, too, is a retired railroader, having spent 44 years as a railway machinist. He is pictured with the Just Rite Angle and Bevel Caliber gauge which he perfected.

THE WORLD IS THEIR Oyster

By Herbert H. Ringold



Illustrated by Capt. Raymond Creekmore

"BET a dime."

"I see."

"Up a dime. Say, where's Klotz?"

"I'm out. He went to Russia yesterday."

"How about Dick Kight? There's my twenty."

"By me. Kight's around. Saw him two days ago."

"I play. No, he left for India this morning."

"I'm out. Let's throw away this deck and get one with some aces in it. If these cards don't get any better, you guys will have to wait until I get to China again. The adjutant over there owes me 47 bucks. And it's about time that weather officer in Cairo came through with the six I loaned him."

"Come on, let's play poker. I need some dough myself. I got a date coming up with that British nurse in Karachi."

That's the kind of conversation you get around the poker table, when the players are members of the 26th Transport Group of ATC's Domestic Transportation Division. This is a "special mission" outfit, on call for any emergency—anywhere, any time. To these guys, flying to Moscow or Chungking or Melbourne is about as exciting as going to the nearest latrine.

You sit down beside a couple of them listening to the phonograph playing "Coming in on a Wing and a Prayer."

"Say," says Captain Ralph Reed, "next time any of you guys get down to Natal, pick up a couple of my shirts. When I came back from Africa last time I was too damned tired to get them."

Reed explains why he didn't stop to get his shirts.

"There were 400,000 pounds of high priority materiel piled up at Natal. Rommel was in El Alamein then and the Allies needed that stuff in a hurry. Our CO, Lieut. Col. Willis H. Proctor, was on hand to supervise the job. We had seven ships, and in 36 days we moved 388,339 pounds of equipment over to Africa. All of us made two round trips a week. Each plane had a double crew and one crew would leave Natal at 1700 o'clock and get into the West African base in the middle of the afternoon. We would leave Africa that night and land back in Natal the next morning. The mechanics worked on the ship for five or six hours and then the other crew went out. We got two good nights of sleep out of every five. Let's see, I think I left Natal on Wednesdays and Sundays."

Four meals on four continents in three days is not unusual for these flyers of the Air Transport Command.

Reed hastens to explain that it was all routine flying. Nothing to get excited about. Nothing interesting happened. Very dull and monotonous. A job to do.

"Yeah," says Captain Vernon M. Byrne, "after you jump the ditch once, it gets sort of boring. The only real fun I've had was the time I took 100,000 one-dollar bills over to Africa so the ghost could walk on pay day." (You find out later that he has made eleven round trips across the South Atlantic.)

Captain Joseph E. Kimm agrees with Byrne. "Nothing exciting happens to us. It's the boys in combat who are really doing the work. We just fly around."

"Flying around" to Kimm has meant pioneering the air route up to Alaska, making ten round trips across the ocean and flying the first C-87 to India.

"The fellow who had some fun," Byrne continues, "was Captain Alexis Klotz. He's been around more than most of us anyhow. I think he's in Russia right now. On one trip he carried 7,000 pounds of mercury fulminate. If you sneeze twice that stuff will blow up. If I know Klotz he just set it down nice and careful like, yawned, and made a routine report to operations. His flight plan called for four stops but with that delicate load on board he made it in two."

"Speaking of odd cargo," says Kimm, "Why don't you ask Reed about that stuff he brought in from Iceland?"

Reed laughs. "Oh, I just picked up some Danish pastry in Iceland one morning and my wife and I had it for dinner that night in Washington."

You ask about the kind of cargo they usually carry and are told it is all critical materiel or high-ranking dignitaries. As a matter of fact, the 26th Transport Group claims: "If we haven't flown you, you're not a big shot statesman." Most of the time, the men don't even know the kind of cargo they have in their ships.

Somebody walks over and starts playing "Wing and a Prayer" again. That reminds Reed of the time he was flying a C-87 to Africa. About an hour out of South America, he lost his gasoline cap and the gas started to siphon and leak into the cabin. They cut off the radio for the slightest spark would have blown the ship to hell and gone. They just had to fly around praying until the gas got low enough. And they couldn't contact their base or any curious gunner to announce that they were friendly.

What kind of weather do they find?

Byrne says, "Around Africa you'll find a lot of fronts, but they aren't much to worry about if you play it safe. Go around or underneath them and look for holes. The best thing to do is run parallel down the coast of Africa and hunt for a spot to get through. But don't try to tear into the fronts at medium altitudes or you'll get yourself a pretty rough ride."

"That's right," Reed adds. "Stay down around 1,000 feet. You'll find that the turbulence is very much lighter. But be sure you are out at sea before you start letting down to 1,000. Otherwise, you'll spread yourself all over an African mountain."

"All you have to do," Kimm says, "is listen to your briefing officers. You get briefed from station to station by experienced men who know their business. Every one of them has flown your route and they go out on periodic flights to check up. Just do what they say."

"Around Puerto Rico, the weather's different," says somebody whose name you don't get. "Down there, you'll find a lot of severe electrical storms. Keep out of the clouds and you'll be all right. It's a good idea to put your wheels down so you can handle the ship better. That slows you down and gives you more control."

You find out that these men run into all kinds of weather. One day they are in a hot climate and the next day it's way below zero. They start out in khaki and wind up in electrically heated suits. A lot of peculiar things can happen when you fly from hot weather into cold, or the other way around. Your oil tanks should be covered in cold weather, but when you get into the hotter climates be sure you remove that cover. In the hot countries don't screw the gas tank caps on too tightly because the gasoline expands and you are liable to burst a tank. If you use a thin oil for winter weather, change it the minute you land wherever the temperature is high or it will congeal and you'll never get it out. If you are flying through severe icing conditions and your manifold pressure starts dropping, don't increase the throttles. You are losing speed because of the ice—just apply heat to the engines, don't boost the manifold.

Captain Reed gets up and says, "Let's go down to the enlisted men's quarters and talk to the men who know that kind of stuff." You walk down to a day room and run into Master Sergeants Wells E. Brown, Clyde W. Nowlin and Leo J. Zulkowsky and Sergeant M. A. Greco.

Brown helped evacuate Java and flew in the last American plane out of the Philippines. Zulkowsky ran the first survey route of Greenland in a B-24. Greco has made nine round trips across the South Atlantic. Nowlin, a charter member of the old Ferrying Command, made the first ferrying hop to Russia and 34 other crossings over both oceans.

Their experiences? "Routine flights, nothing much ever happens." Nowlin does admit that when he landed after his first trip to Moscow, they put a yardstick into the gasoline tank to check their supply and it came out completely dry!

They talk about the fact that they never know where they're going until two hours before the ship takes off. "When we went on one trip," Greco recalls, "we were given maps for both Russia and Japan. Just before we left they told us we were going to Casablanca."

"Talking about Africa," says Nowlin, "if you have to make a forced landing there the bush will seem deserted, but there are few places you can land without being seen. Just wait a couple of hours and some natives will come to investigate. Be sure not to frighten them with a display of firearms. While waiting, don't leave your ship. It's easier to find a plane than a man. If you burn the oil from your engines it will give out a heavy black smoke which is easy to see from above."

"And watch out for the Wogs around Africa," Greco adds. "The Wogs are African soldiers serving the Allies. They do sentry duty and they only understand two words of English—'stop' and 'go.' When they say 'stop,' freeze or you'll get a couple of feet of cold steel through you. Don't play around with those boys."

You ask for maintenance tips.

Zulkowsky says, "Be sure to keep your radio off when you transfer gas in a B-24. The slightest spark will blow you up."

"And when something goes wrong with your radio equipment," adds Brown, "don't take the set apart. Check the plugs and fuses. Instead of ripping out the equipment, look for the minor troubles. You'll usually find a loose plug or a blown fuse causing the difficulty. And when the radio won't work on compass position, nine times out of ten the trouble is in the inverter. Check it thoroughly."

"And tires," Nowlin continues. "In cold climates you check tires for leaks by spitting on your finger, putting it on the valve and seeing if any air comes out. Be sure to blow the vapor out of the valve when you're finished. Otherwise, it will freeze, expand, and you'll get a flat tire."

"Tell the mechs," says Zulkowsky, "to carry enough tools with them to do their jobs. They'll be getting places where there just aren't any tools."

Together they agree that everybody in the crew should know how to do every job. When you are flying for ten and twelve hours at a time the fatigue element plays a big part, and if one man gets tired somebody else can relieve him temporarily. It's always a good idea for everybody to know everybody's business.

As you close the door on the enlisted men, one of them is saying, "Drive into town with you? Not the way you handle a car. It's too damn dangerous." ☆

ARMY FLIGHT CONTROL *Advises...*

By Lieut. Col. Ralph J. Moore

HEADQUARTERS, FLIGHT CONTROL COMMAND

EVERY day in some sections of the United States, Army pilots hear the words, "Army Flight Control advises. . .," followed by such warning messages as:

"Heavy icing vicinity of Cleveland between 5,000 and 7,000 feet. Advise change in altitude."

"Your destination closed to all except instrument flights due to low ceilings. Advise landing at alternate or continue CFR to Redfield."

"Violent thunderstorms along your route. Advise you proceed via Yorktown to destination."

These and dozens of other warning messages are keeping Army flights in this country out of serious trouble. No longer is the military pilot a "lone wolf" of the sky. Today for the first time in U. S. military aviation, a system is being installed to plot and trace the progress of every military airplane engaged in point-to-point flight in this country.

This system is being set up by the Flight Control Command, Winston-Salem, N. C. Specially trained flight control officers are being placed in control centers throughout the United States to trace the progress of each airplane and stand ready to dispatch emergency warning messages, with minimum loss of time, through communications stations nearest the pilot.

Here's how the new Pilot's Advisory Service works: A pilot, while planning his flight, selects the radio range stations he will call en route and lists these on his flight plan. All flight plans are sent by the operations offices to the flight control centers for the area, whether the flight is on or off the airways, CFR or instrument, day or night. Every flight is plotted, either on the airways flight progress boards or on specially designed magnetic maps.

Take a look at a flight control center in action. Before you is the magnetic map with markers scattered over it. A moment ago a flight plan came in by interphone from a base operations office. Within a few seconds this flight plan is in the hands of a control officer who inspects it to see that all necessary information has been furnished. An abbreviation code is used to mark up a slip of paper giving the serial number of the airplane, its type, its air-speed, the point of departure, destination, actual time of take-off, estimated time en route and the radio ranges which the pilot will contact.

This slip of paper fits into a slot in the top of a movable arrow marker which is placed on the magnetic map at the point of take-off. Every fifteen minutes this marker is moved along the stated heading for the flight consistent with the airspeed

At the AAF Flight Control Center in East Boston, Mass., Lieut. Franklin D. Harrington, Jr., maps the positions of military planes in the control area.

Two officers note the movement of aircraft from the magnetic map while the East Boston control center CO, Maj. William L. Thorburn, studies flight plans and progress reports coming in by teletype.

Lieut. Joseph W. Reeves checks a flight plan while sitting in the control position. Before him are the Flight Control Panel, weather sequences and other data pertinent to a pending flight.

of the plane. From time to time the positions of aircraft are adjusted to coincide with pilots' position reports which are relayed through range stations. At any moment the flight control officer can tell you with surprising accuracy where each airplane is and through which radio range the pilot can be contacted.

Meanwhile, other officers in the flight control center are collecting data on weather conditions in the area. Sources of weather information include the Army Weather Services, United States Weather Bureau, and data furnished by pilots' reports on ceilings, icing, turbulence, etc. From this composite of information an analysis of weather movements is made and studied in terms of the weather conditions likely to be met by each flight.

While this is in progress, another control officer is receiving position and arrival messages, and the teletype is hammering out warning notices concerning fields that are closed, runways under construction, hazardous obstructions, practice tactics that are a menace to planes, and other valuable information.

Thus, at his finger tips, the chief Army flight control officer has complete information on weather, changes in radio navigational aids, traffic and practically every other hazard about which the pilot should know. This is the information on which Pilot's Advisory Service is based.

Let's, for example, take the story of a warning message that got through to one pilot and not to another. The two planes take off from nearby fields for the same destination on cross-country instrument flights. Their flight plans come in to the flight control center and are posted on the Army flight control plotting maps. Every fifteen minutes for two and one-half hours they are moved along on the map. Suddenly the forecaster receives information of unexpected bad weather. A severe cold front is pushing rapidly across the line of flight, closing both the destination and alternate airports of these aircraft. A warning is prepared and interphoned to the range stations nearest the two planes as indicated on the map plotting board.

Within less than a minute the pilot of the first ship, who has made regular position reports and whose radio is tuned to the range station, hears the attention sig-

Operation and aim of the new Pilot's Advisory Service of the Flight Control Command.

nal, a sputter of "dits" in his ear. He switches over to "voice" and hears the radio range calling him. Responding, he is told, "Army Flight Control advises heavy icing thirty minutes ahead of you, and your destination and alternate closed due to low ceilings. Suggest you reverse course and land at . . ." This pilot has no love for heavy ice or low ceilings. He executes a 180-degree turn and in a few moments is sipping a cup of coffee with his feet planted on a stout plank floor.

Meanwhile, the other plane is moving rapidly toward the heavy weather. Flight Control is getting anxious and has every range station along the line calling the pilot. A dance band or other diversion keeps his radio tuned to everything except the range stations that are trying to reach him.

The weather is thickening. The pilot plows on and finally calls his destination as icing becomes a serious problem. An hour after the other plane is safely on the ground, this pilot is informed his destination and alternate are closed by low ceilings. In reversing his course he encounters even worse weather. Before long, heavy ice is dragging the plane down rapidly. In the nick of time most of the crew bail out, but the pilot jumps too late.

Here were two planes that took off at about the same time, traveling the same route toward the same destination. In one case the flight was safely terminated. In the other case, a potentially good pilot was killed, a crew demoralized and a badly needed airplane was destroyed—all due to lack of proper radio communication with the right stations at the right time.

This is not a bedtime story pulled from thin air to help put the children to sleep. Too often Army Flight Control tries to raise a pilot with an important radio message without success. Sometimes the plane runs smack into the trouble and only by resourceful action is the pilot able to bring the airplane and crew home safely. At other times Flight Control watches planes go on and on to certain disaster while warning messages go unheeded and the pilot and crew either get a free parachute ride or end up in a tangle of wings and twisted props on some lonely hillside.

Army Flight Control will be nationwide in its operations by December 31, 1943. On June 1, 1943 it was activated in the Seattle and Boston Flight Control Centers. Early in July four more centers went into action, in the New York City, Washington, D. C., and the Oakland and Burbank, Calif., areas. Several other centers were to be activated this month. Base operations offices can inform pilots of areas in which Flight Control is offering the Pilot's Advisory Service and pilots should plan their flights accordingly.

Full use of radio facilities is part of the essential training of the young pilot and his crew. It is force of habit with the older and more experienced pilots. Use your radio; tune in on every radio range on your route. You may be the pilot they are trying to locate. And use the Pilot's Advisory Service whenever you pass through an area where it is offered. ☆

THE PAPUAN CAMPAIGN

By Colonel Frederic H. Smith

How the U. S. Army launched its first great land-air offensive across the Owen Stanley Range.

WHEN the Papuan campaign ended in January, 1943, with the Allied occupation of Buna, Gona Mission and the Sanananda sector, and the complete destruction of General Horii's army, there came to a close the first fully integrated land-air offensive ever undertaken by United States forces.

The action was most significant. Air power was used to its highest advantage, not according to old and narrow concepts of air support but with an eye to all its manifold functions.

In fact, the transport of ground troops and supplies over difficult terrain with a vast resultant saving of time and life was concededly the air arm's most important contribution to the victory. Bombardment and strafing operations were relentless and effective. But always they were subordinate to the mass hauling by air of ground troops, artillery weapons and supplies.

Probably sixty percent of the Allied ground troops were flown by air across the Owen Stanley Range and were landed fresh and in full force close to the battle lines. The troops flown to combat amounted, conservatively, to a full division.

Our aircraft also transported jeeps, machine guns, Befors, 25-pounders and even some 105 howitzers. Other supplies were dropped continuously. Our record day saw approximately 350 tons transported, and a fair daily average would be around 115 tons. The distance was 110 miles from Port Moresby to the front.

It was this campaign, moreover, that witnessed our first mass air evacuation of casualties. All Allied sick and wounded were flown back across the mountains, accomplishing in less than an hour a journey which normally would have required a couple of weeks by donkey-back.

While no comparative figures are available, it is believed that our air units hauled more—on a per ton-mile basis—than the Germans at any time in this war.

Proper evaluation of the Papuan campaign calls for a brief review of its development and of the circumstances with which our forces were confronted.

Strewn along a New Guinea beach are Jap barges wrecked in an Allied raid. Heavy strafing has stripped the palm trees.

On July 21-22, 1942, the first units of a Japanese army under General Horii succeeded in landing at Gona Mission. Allied air action against the Jap naval unit of three transports, two light cruisers and three destroyers was intense but insufficient to prevent the beaching of some 4,400 troops and supplies. One transport was set afire and became known as the "Gona Wreck," to be used later by the Japanese in an interesting manner.

This Jap army was subsequently reinforced by several thousand additional men and by September 27 had crossed the Owen Stanley Range, driving to within 32 miles of Port Moresby.

Here Allied resistance stiffened and a strong defensive position was established at Iorabaiwa Ridge.

IT is noteworthy that the Japanese never gained air superiority. From July 20, 1942, to January 23, 1943, they raided Port Moresby only about thirty times, with no really serious results, and molested our ground forces only occasionally. Our air units harassed their dromes at Buna and elsewhere, knocked out many enemy aircraft and later, when our offensive was under way, completely dominated the sky.

However, before our air power could be brought into full play, it was necessary to recapture the landing field at Kokoda, on the enemy's side of the Owen Stanley Mountains.

This was a slow, costly process. Ground units had to drive the Jap back up the jungle track, wiping him out of ravines and pockets in dense foliage where observation was always difficult. Six weeks were consumed before our troops succeeded in fighting back across a gap in the range to take Kokoda on November 2.

By November 4 a landing strip at Kokoda was ready for our use and supplies for our troops began to be flown in. The Japs retreated six miles or so down the Kokoda-Wairope track to make a stand at Oivi, but they were subjected to such heavy ground attack and strafing from the air by Beaufighters and A-20s that on November 11 they were forced out of Oivi with considerable losses.

In this phase of the operation, our airmen kept the enemy's supply lines under daily attack. Particularly heavy bombing and strafing of Wairope, Kakendetta, Popondetta, Soputa, Sanananda and Buna was done by A-20s, Beaufighters and B-26s.

One of the important troop transport operations began on November 5. American units were flown from the Australian mainland to Port Moresby and from there

across the mountain range to the east coast of Papua, at Wanigela Mission. By November 15 the whole force with its supplies had been landed at Wanigela, from where it set out on foot for Buna.

THE Japs had obtained some reinforcements but these represented only a fraction of their casualties. Reports at the end of November indicated that some 8,000 to 9,000 of their troops were dead, wounded, sick or missing, and that their force had been reduced from approximately 13,000 to, at most, 4,000. General Horii had drowned in a crossing of the Kumusi River.

After the defeat at Oivi, the next real stand made by the Japanese was on the coast east of Soputa. Enemy resistance was soon reduced to three sectors: Buna, Sanananda-Soputa and Gona Mission.

Gona Mission was the first to fall. The Japs held strongly defended positions and, despite the fact that our A-20s, P-40s and Beaufighters reduced all buildings to wreckage and repeatedly strafed their lines, stubborn resistance continued until Allied ground troop reinforcements were flown right into the forward area. They went directly into action and Gona Mission was finally occupied on December 9.

At Buna there were two fronts—the "New Strip" area and the Giruwa Village area. In the former, the Japs had sturdy pillboxes impervious to 81 mm mortars and 25-pounders. Tanks, however, finally broke the deadlock.

Resistance around Giruwa was also obdurate until the enemy was overwhelmed with fresh troops flown from Port Moresby to nearby Dobudara.

Air attacks had leveled the Buna Government Station and other buildings to ashes (although much credit for this destruction must go also to the 25-pounders of the artillery). But it was not until tanks and other ground units had forced withdrawals from the pillboxes and had captured the Buna drome, driving the Japs into a grove on Giropa Point, that an end was finally brought to the enemy's resistance in this sector on January 3.

The Sanananda-Soputa sector was the most difficult of the three. Here the Japs held out until January 23. Our aircraft pounded the area relentlessly, making it a mass of bomb craters and wreckage. From November 2 to January 23 there were 43 missions directed against Sanananda. These included strafing operations by Beaufighters, A-20s and P-40s, and bombing by B-25s, B-26s and B-17s.

THE Japs held on doggedly however, in an area about a mile in diameter, even after they had been surrounded. But they were at last broken up into small pockets, which gradually succumbed to our ground troops. Except for minor mopping-up activities, the campaign ended on January 23 with the Allies in complete possession of Papua.

Air power had contributed to the success of this offensive in three principal ways: the transport of troops and supplies; the prevention of worthwhile reinforcement, and the harassment of enemy supply lines.

These operations, all under the direction of Major General Ennis C. Whitehead, commanding the advance echelon of the 5th Air Force with headquarters at Port Moresby, were accomplished in the face of severe weather conditions and difficult terrain.

The Owen Stanley Mountains rise to 14,000 feet at certain points and almost always the ceiling above the range is low. Rain falls every day in this area, with as much as forty inches a year at Moresby and perhaps triple that in the mountains. Also, there are tremendous thunderheads

'A New Form of Campaign . . .'

General Douglas MacArthur issued the following statement on January 24, 1943:

"The destruction of remnants of the enemy forces in the Sanananda area concludes the Papuan campaign. The Horii army (Lieutenant General Tomatore Horii commanded the estimated 15,000 Japanese troops in Papua) has been annihilated.

"The outstanding military lesson of this campaign was the continuous, calculated application of air power inherent in the potentialities of every component of the air forces employed in the most intimate tactical and logistical union with ground troops.

"The effect of this modern instrumentality was sharply accentuated by the geographical limitations of this theater. For months on end, air transport with constant fighter coverage moved complete infantry regiments and artillery battalions across the almost impenetrable mountains and jungles of Papua and the reaches of the sea, transported field hospitals and other base installations to the front, supplied the troops and evacuated casualties.

"For hundreds of miles bombers provided all-around reconnaissance, protected the coast from hostile naval intervention and blasted the way for the infantry as it drove forward.

"A new form of campaign was tested which points the way to the ultimate defeat of the enemy in the Pacific.

"The offensive and defensive power of the air and the adaptability, range and capacity of its transport in an effective combination with ground forces represent tactical and strategical elements of a broadened conception of warfare that will permit the application of offensive power in swift, massive strokes rather than the dilatory and costly island-to-island advance that some have assumed to be necessary in a theatre where the enemy's far flung strongholds are dispersed throughout a vast expanse of archipelagos.

"Air forces and ground forces were welded together in Papua, and when in sufficient strength with proper naval support, their indissoluble union points the way to victory through new and broadened strategic and tactical conceptions."

Rifles and ammunition salvaged in action around Buna are brought back by air to an Allied base.

running up to 25,000 feet or more. Most of our flying was done between daylight and noon.

Customary ideas of air support had to be dispensed with, since it was extremely hard to define targets. The Japs rarely presented massed troops against which to direct attack and because of the jungle observation was always difficult, frequently impossible. Results could rarely be determined.

In bombing and strafing operations our air units had to attack well ahead of our own ground forces to avoid casualties. The most effective means by which enemy targets could be defined was through use of smoke shells.

Conditioned by these circumstances, our combat operations developed along the following lines:

P-39s and P-40s were assigned the bulk of our fighter work. Strafing was carried out principally by P-40s, A-20s, B-25s and B-26s, in concert with such Allied planes as Beaufighters. Heavy bombers, including B-17s, were utilized chiefly to attack convoys and prevent successful reinforcement of the enemy.

Our A-20s, B-25s and B-26s dropped many demolition bombs on buildings and storehouses, with much resultant damage, and dropped an unusual number of fragmentation bombs on Japanese troop concentrations. Bombardment operations, however, cannot be considered of vast importance. It is probable that, under the difficult conditions affecting observation and target definition, field artillery would have been more effective had it been possible to get enough of it into forward positions.

All combat missions were flown from Port Moresby, 110 miles south of the main battle area and across the Owen Stanley Range. Scant fighter opposition was encountered. There were some Zeros and other planes based at Buna, but many had been destroyed on the ground before the offensive actually was begun.

While Jap fighter opposition was meager, their anti-aircraft fire was something else again. At many points it was quite heavy and was used adroitly. Anti-aircraft guns were continually being shifted from one emplacement to another for purposes of surprise and were naturally well-concealed.

The "Gona Wreck" was transformed into an anti-aircraft position which, despite repeated bombings and strafings, was effective right to the end of the Papuan campaign.

Our air attacks certainly contributed much to the final victory. During November extensive destruction of supply dumps and gasoline drums was accomplished, numerous barges and native canoes being used by the enemy were strafed and set afire, and the Buna Drome was rendered virtually useless.

During December two large-scale attempts to land reinforcements were opposed by our air units. And, while some troops were put ashore in both instances, the attempts were not in themselves very successful. Of the Japanese who landed many were destroyed by strafing, several barges were sunk or burned, and their stores, drawn up on the beach, were left smoldering. What probably was another reinforcement attempt, in January, was broken up far to the north near Lae.

Despite the acknowledged importance of these and other operations, however, it is clear that in view of the bad weather and bad terrain the handling of ground units was the key to the final outcome. It was in the transport of such units and their supplies that our air power was most useful.

Loading and unloading of transports was handled by crews of the ground units, and the work went smoothly from the very outset. Bulky equipment was invariably broken down into small loads for expeditious handling.

The planes used were mostly converted

DC-2s, DC-3s and C-47s, all flown by pilots with troop carrier training. Landing fields were built quickly as our ground units progressed. No mats were used, for our engineers found it fairly simple to construct strips in the open savannahs of the area merely by cutting the grass and doing a slight amount of leveling. This situation obtained only in the Buna area, however.

Throughout the Papuan campaign, Japanese opposition was extremely determined. They were hopelessly outnumbered and knew it, as the rather pathetic entries in their diaries revealed. But they fought fiercely and with high morale.

Had our ground forces been required to march 110 miles through jungle and over mountains to reach the front, had we not been able to transport by air sufficient reinforcements to bring about relatively quick decisions in certain areas, the loss of Allied life and materiel against this stern opposition would have been infinitely greater. And there is no estimating the amount of time that would have been consumed in gaining the victory.

Thus, the Papuan campaign, first large-scale demonstration of a modern ground-air offensive by the U. S. Army, was eminently successful and was—to ground and air officers alike—an impressive preview of things to come. ☆

Here's another quest for information, please. Chalk up five points for each question correctly answered. If you score Ninety, the next higher rank is none too good for you. Eighty is excellent; seventy, good; sixty, fair, and fifty, below par. Watch out for the flak. Answers are on Page 44.

1. What is the armament in the B-17 belly turret?

a. One .30 and one .50 coliber mochine gun
b. Two .50 coliber mochine guns
c. Two .30 coliber mochine guns
d. One .50 coliber mochine gun ond one .20 mm cannon

2. When an enemy fighter, just out of range, starts to come in, what is the best thing for an aerial gunner to do?

a. Hold your fire until he closes so os not to waste valuable ommunition
b. Give him o burst ond let him know you see him even though you con't hit him
c. Coll out his position ond look oround for other enemy plones
d. Apply for Officers Condidote School

3. What is pilotage?

o. Flying by use of maps ond recognition points
b. The 26 year old oge limit established for AAF pilots
c. The approved method of flying through an overcast
d. Elements of flying tought in pre-flight school

4. The best way to prepare your eyes for night flying is by

a. Putting o patch over one eye
b. Looking steadily ot a red light for opproximotely ten minutes
c. Wearing night odopter goggles for about holf on hour
d. Eating lima beans

5. An aviation cadet named Smith is addressed

a. Cadet Smith b. Smith
c. Mister Smith d. Condidote Smith

6. What is the recommended way to thaw a frozen hand?

a. Use hot woter
b. Rub snow on it
c. Exercise vigorously and allow blood to warm it
d. Put it under your ormpit or between your legs

7. Identify this airplane:

8. You are low over the ocean in enemy territory and your drift meter isn't working. How can you determine wind velocity?

a. Call nearest weother stotion
b. Watch the white caps
c. Wet your finger ond stick it out of the side of the plone
d. Throw something out of the ship ond watch it foll

9. When a newly commissioned officer receives his first salute, he traditionally

o. Initiates an odditionol solute
b. Never returns the first solute
c. Poys out a dollor
d. Buys o drink

10. What is wave bombing?

a. Torpedo ottocks mode by dropping bombs on the wovetops
b. Coming in low over the waves
c. Attocking o torget in woves of plones
d. Using 100 pounders and incendiaries

11. What is a landfall?

a. Hitting the eorth from a parachute jump
b. A complete victory over the enemy
c. Sighting land when you come in from over woter
d. A term describing the hill-and-dole-like nature of the terroin

12. Four Air Forces have permanent Headquarters in the United States. Associate each with its proper location.

a. 1st Air Force b. 2nd Air Force
c. 3rd Air Force d. 4th Air Force
1. Tampa, Florido
2. Mitchel Field, New York
3. San Froncisco, Californio
4. Colorado Springs, Colorodo.

13. What is the shortest air distance from Dutch Harbor to Tokyo?

a. 2840 miles b. 2260 miles
c. 3185 miles d. 1900 miles

14. Find the error in the following statement

The navigotor in the P-39 watched the lead plone chandelle up, do an Immelmonn, a holf-roll, and dive steeply owoy.

15. Army nurses, no matter what their rank, are never saluted by enlisted men.

a. True b. False

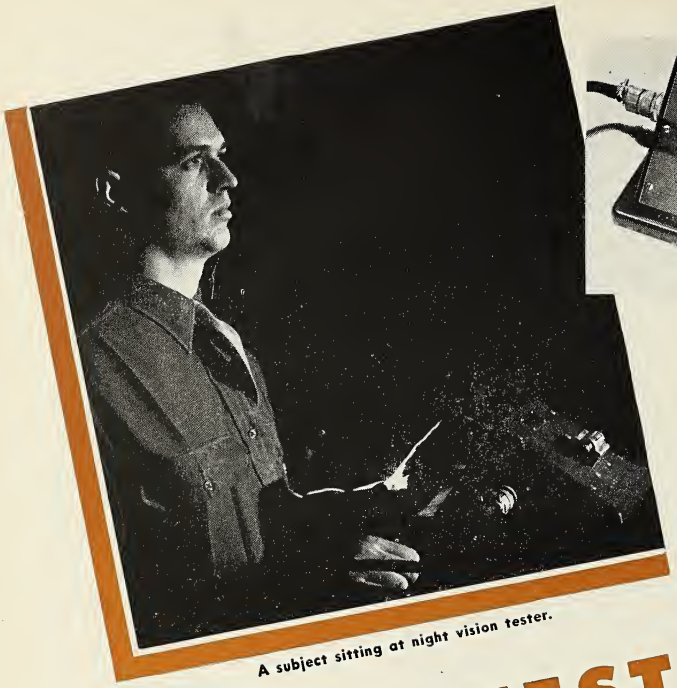
16. March Field is located in

a. Texas b. Californio
c. Louisiano d. Georgia

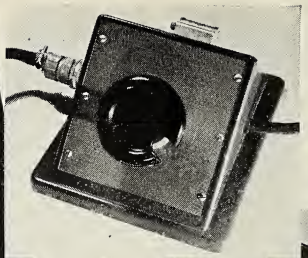
17. In the AAF the word "mosaic" most commonly refers to

a. A reconnoissonce plane
b. A temple in India
c. A composite photograph formed by motching a number of photogrophs of contiguous parts token from the oir
d. A tribe of Arabs in North Africo friendly to flyers

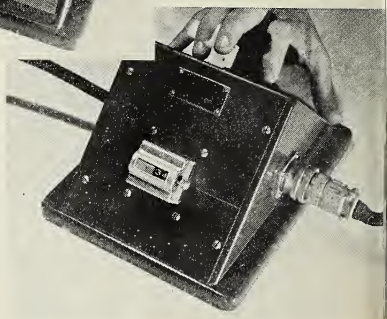
18. Identify this airplane:



A subject sitting at night vision tester.



The notched knob at left must be oriented with break in lighted "C" flashed across the room. Recorder (below) clicks when the setting is correct.



TESTING FOR

By T. A. Berchtold

WRIGHT FIELD

A NIGHT vision testing machine that determines the ability of soldiers to see objects at night is now in use, and may soon be placed in the Army's classification centers and gunnery schools. The machine was largely developed at the Aero-Medical Laboratory at Wright Field.

Earlier in the war it was discovered that airmen who made the poorest scores in night vision tests generally returned to their bases with the poorest night combat results. This finding immediately stimulated extensive study of the peculiarities of night vision.

Scientists recently have discovered that an entirely different part of the eye is used to spot objects at night than during the day. One can see objects most distinctly at night by looking, not at but *to either side* of an object, while during the day the clearest image is obtained by looking directly at the object.

Here's how scientists explain the phenomenon:

The eye has two different sets of nerve elements, cones and rods. The cones, located in the center of the retina, make it possible to see objects in daylight or under artificial lighting. Through them, colors and fine details can easily be distinguished. The cones are concentrated in the center of the retina and are scattered thinly toward the periphery. These cones are of practically no use in discerning objects in dim light.

The rods, on the other hand, are most numerous toward the periphery, *away* from the center of the eye. For this reason, objects are distinguished at night by the rods because they are about 1,000 times more sensitive than the cones in dim light. Perception of color and detail is a function of the cones, rods are good only for spotting objects in dim light.

Hence, under darkened conditions, objects can best be seen by looking to one side—from five to ten degrees off center. The cones in the center of the eye constitute a "blind spot" at night which few individuals know they possess.

ARMY scientists at Wright Field's Aero-Medical Laboratory, working with the new night vision tester, discovered that the lowest-scoring individuals of any group tested need approximately ten times more light to discern objects at night than do the highest-scoring individuals.

Translated into combat terms, this means that lowest-scoring airmen see an object only if it is twice as large as that same object viewed by men with the highest scores. In more vital terms, it means that those having the best night vision can see an enemy plane at twice the distance than those with the poorest. This may well mean the difference between success and failure of a mission.

According to the scientists who developed the machine, the average individual has a wide range of night vision and, moreover, men from the country have a more highly developed sense of night vision than those from the city. Experiments have shown that five percent of any group taking a night vision test for the first time fail in the test because they cannot immediately accustom their eyes to looking at an object off-center instead of squarely in the middle. Less than one percent, however, fail the test entirely after being given a second chance.

The night vision testing machine, which will enable the Army to classify its men as to their night vision aptitude, consists of two parts: a rotating white disc (located twenty feet from the subject being tested), in the center of which is a black letter "C" with a one-inch break in it, and a manual recorder with a C-shaped knob which the individual must match with the "C" on the revolving disc.

During the test, the rotating white circle with its black "C" stops forty times, each time in a different position. The duration of each stop is seven seconds, and after each stop is an interval of nine seconds of darkness. At first, the

Lighted "C" flashed on screen.

You don't have to be endowed with cat eyes to see objects at night. This tells you why, and how you can best adapt your eyes for night vision.

NIGHT VISION

white circle is fairly bright, but with each succeeding five stops the light becomes more faint so that by the time the test is concluded, only those with superior night vision can detect the round patch of light. There are eight levels of brightness, each level with five successive stops and each stop in a different position.

During the seven seconds that the white circle is illuminated, the individual must place the "C" knob which he is operating in the identical position of the "C" shown at the other end of the machine. When the light goes off, he is permitted another three seconds in which to make a quick change on the recorder if he feels he might have made an error. An electrical impulse then registers whether he has correctly coordinated the two Cs. Each of the correct matchings is recorded and the total score at the end of the test reveals his rating. A click lets the student know whether he has "hit the mark" each time the machine registers.

On the present system of scoring, those getting from 31 to 40, inclusive, are above average; those with scores from 21 to 30, average; those from 14 to 20, below average, and less than 14, unsatisfactory.

It requires half an hour for one's eyes to become accustomed to seeing objects in dim light. Therefore, men taking the test are either placed in a dark room for that length of time before the test is begun, or they are equipped with red goggles which achieve the same effect.

The night vision tester is operated by a single individual who can test from 250 to 300 persons a day. ☆

NIGHT ADAPTER GOGGLES

THOSE red goggles you are asked to wear for a half-hour just before taking off at night do the job that was formerly accomplished by sitting quietly in a dark room for the same length of time. Use of goggles permits you to read, move around, play poker and, in general, spend a pleasant half-hour just taking it easy. You know, of course, that in order to adapt your eyes for seeing objects in the dark or under dim lighting, a half-hour period is necessary to prepare your eyes for such activity.

Remember, too, that if you look at an illuminated object or instrument light without those goggles after you have prepared your eyes for night work the "spell" is broken, and you'll need to go through a half-hour adjustment period all over again. Once your eyes have been adapted for night work, even a brief exposure to a bright light will destroy the efficiency of your eyes for spotting objects in the dark — unless you wear the goggles.

You'll discover, too, that the new goggles are extremely flexible, can be folded in the middle, and fit snugly into your shirt or blouse pocket.

These night adapter goggles when worn for thirty minutes prepare pilot's eyes for night flying. Designed for flexibility, they fold in the center and fit into a handy pocket-size case.

THE AIR SERVICE COMMAND

By Maj. Gen. Walter H. Frank
COMMANDING GENERAL, AIR SERVICE COMMAND.

KEEP 'EM FLYING — everybody has adopted this slogan. But the Air Service Command is really in the business. The Command's mission is "to maintain the maximum possible percentage of aircraft furnished the Army Air Forces in combat readiness." And the activity of the ASC is a business. On December 16, 1942, the ASC was reorganized on that basis—"the activities of the Air Service Command are more closely related to those of business management than of military operation; the Air Service Command is an industrial organization managed by the military."

This is big business, too. Eight months ago figures on the ASC far exceeded comparable ones for General Motors, reputedly the world's biggest corporation. The Command had more personnel and warehouse space, and it handled more material.

The ASC is operated by 300,000 civilians, and the military management consists of approximately 8,000 officers. Another 7,000 officers and 150,000 enlisted men are under its command being trained for Command activities overseas. The civilian personnel represent eighty percent of the total civilian employees of the AAF. In contrast to employees of most other government agencies, only a very small percentage of these civilians are stenographers and clerks. In the ASC they are highly skilled mechanics, technicians, engineers, administrative assistants and executives. The officers, excepting those with service groups, air depot groups and the related training activities, were commissioned mainly from responsible positions with our large peacetime corporations.

These officers bring their experience and knowledge immediately to bear on their job and find a minimum of military procedure to deal with. The problems they find in the ASC may be bigger than those to which they were usually accustomed, and time is always pressing, but the principles are similar and the solutions of some of these problems have given the Command better systems of property control and maintenance methods than have ever before existed. In fact, when aerial puddle-jumpers become commonplace after the war, the ASC will already have solved, in principle, the problems of supply and maintenance in the age of flight. The ASC has already trained enough personnel to give such industry a good experience level.

How the world's largest "corporation" functions under a decentralization program.

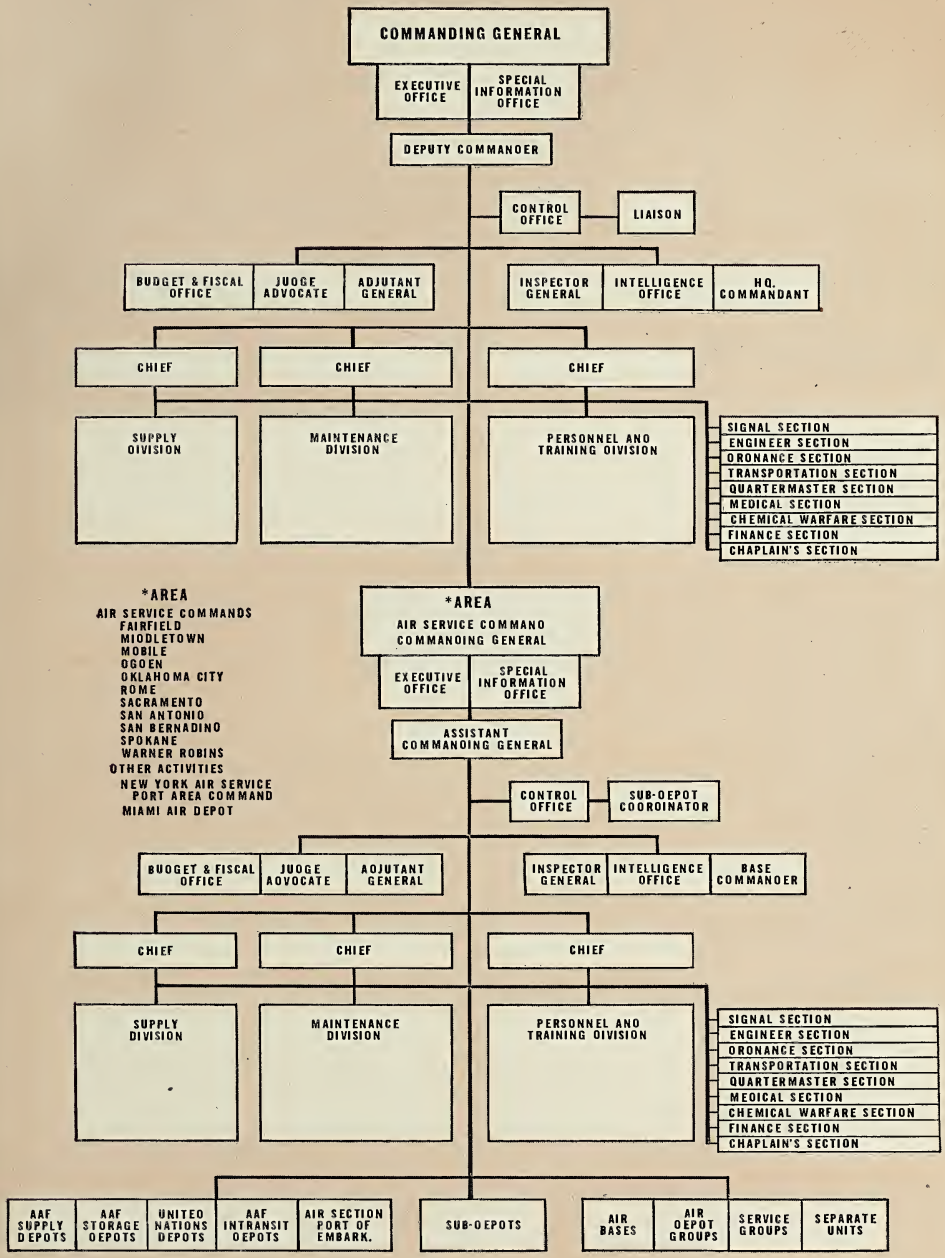
The Air Service Command is the typical expression of modern war. Its organization illustrates the fact that a distinction between industrial activity and military operations is no longer clear-cut. The Command represents a merger and it successfully transfuses industrial experience and effort into military action.

Having recognized its status as an industrial organization, the ASC has abandoned the traditional military staff and introduced a component into the armed forces which embodies a new concept. It was found that the staff organization was not adapted to ASC operations. The activities of the Command did not divide themselves along the lines of the usual staff functions but of the functions of supply, maintenance, and personnel and training. Experience at sub-depots and control depots had shown that this was a natural grouping. Our headquarters followed suit. The real change effected in the ASC headquarters was not in the abandonment of staffs as such, because their functions are still exercised somewhere among the divisions, special sections and administrative officers; it was the decentralization of authority at the same echelon. The commanding general designated those officers who formerly had been his advisers only, to be definitely responsible for certain functions, and gave them sufficient authority to discharge this responsibility. And now when he requires advice his experts are at hand. Overall planning was established as a function of the control office.

A standard organizational framework was developed and *all* echelons of the ASC were organized alike. The chiefs of the divisions at Command headquarters were the big operators and had the responsibility for their respective functions throughout the entire Command. This same relation exists between all components at any echelon. Thus, activities which had been traditionally organized along the concept of installation or command were organized vertically without regard to location.

THE idea of management was introduced to the ASC with specialists in organization, procedures and administrative practices. The commanding general was provided a control room where the status of his program was portrayed and all the information leading to necessary decisions was available. The control room of the ASC, which is closely guarded because

AIR SERVICE COMMAND



of the nature of the Command's activities, probably presents as complete a picture of the AAF program and operations as exists outside of Washington.

The committee type of operation was adopted. Instead of a piece of paper, outlining a proposal, being routed through a series of officers for comment and then back again when the comments have been considered, the responsible persons are informed of the problem and called as a committee; final decision is obtained without further delay. The flood of paperwork between echelons was reduced by the application of straightline control and personal contact between echelons.

Most AAF personnel are familiar with the ASC through contact with sub-depots which are only the terminal activities of this Command in the United States. As a result, they frequently are unaware of the huge activities which support these sub-depots and keep the supplies flowing overseas. More supplies are now required overseas than in the United States. The supply division has devised automatic supply tables, pack-ups and ingenious crating procedures. The automatic supply tables are lists of supplies by type airplane for a certain number of combat units, usually thirty- to ninety-day periods, and are shipped without requisition in accordance with movements of plane. Operations from various theatres and changes in design of plane cause these tables to be constantly under revision, and the ASC sends observers overseas to report on these matters. Pack-ups represent a method of putting supplies together for special purposes, eliminating unnecessary unpacking and recrating on the other side and special requisitions.

In the United States the supply division has numerous depots for special purposes and by teletype controls the distribution of hundreds of thousands of items. If a part is required for a plane out of commission and the sub-depot is contacted, it is not just the sub-depot facilities that are being tapped but the whole supply setup in the ASC, because if that part is available anywhere in the United States it can be located immediately on the same network system of property control.

But these operations are routine and do not represent the magnitude of the supply division's task. The real problem of the division is to analyze consumption data, study strategical problems and tactical operations in order to determine projected requirements for planes of the AAF, and those furnished our Allies under lend-lease. The job of preparing a spare parts consumption list for a new type of plane is so difficult in itself as to be mostly "by guess and by God," but the revisions necessitated by experience and changes of design in the plane after it has been in combat all over the globe stagger the imagination. By the time a stock is established it may be obsolete. But the supply division is on a day-to-day basis and is in constant contact with manufacturers, returning obsolete parts to the production line and flying critical parts directly away. It is safe to say that nowhere in the world is so much material on such a fluid basis.

PERHAPS the best way to explain what the maintenance division does is to begin by saying that this division at Command headquarters receives all Unsatisfactory Reports and issues all Technical Orders. Whenever there are American planes there are T.O.s. They are almost a part of the plane itself and those who operate aircraft must be as familiar with them as they are with the planes and their tools. The job of publishing T.O.s is probably the biggest continuous editorial activity in the world. T.O.s are printed in all languages of our Allies to accompany lend-lease aircraft. They are distributed to every part of the world where there is an American plane. Most frequently this is accomplished by microfilm sent to overseas activities where reproduction and distribution are handled by publication centers. The sheer bulk of T.O.s is not of great significance; it is their standard of technical excellence and accuracy which represents a publishing feat. Furthermore, it is not their world-wide circulation which is really impressive but the efficiency of the distribution system and the rapidity with which it can be effected.

"Gotta Get Those Spares"

The story of Unsatisfactory Reports is probably the most dramatic aspect of the ASC. It is these thin red sheets of paper that come into headquarters at the rate of 8,000 a month which frequently tell a story beginning with some pilot's death, the end of which will be the saving of many of his comrades' lives. These URs are the means by which the collective experience of thousands of pilots and mechanics may be brought into the solution of the deficiencies of our aircraft and thus enable their constant improvement.

But the maintenance division is far from being a paperwork organization. Its shops perform third and fourth echelon maintenance on all AAF planes. Production lines of aircraft industries may make the plane but the maintenance division makes it over again two or three times in its career. Maintenance activities extend from the repair of the most delicate instruments in the world to the replacement of whole wings on the biggest planes, and from air-conditioned instrument shops to canvas maintenance shelters in the middle of the desert. The headquarters of the maintenance division may be in Dayton, Ohio, but it is affected by weather conditions all over the globe—sandstorms on the desert and the cold of the Arctic. A small army of manufacturers' representatives is in all parts of the world acclimating their type of planes to the combat conditions encountered and reporting back to the maintenance division and their companies.

The maintenance division does the work and the supply division furnishes materials with which the work is done, but it is the personnel and training division that supplies both the men who supply the materials and the men who do the job.

Obtaining trained civilian personnel is now out of the question. In fact, it is hard to obtain personnel of any sort, and the men who have been trained through the years are being drafted. Consequently, the personnel and training division now relies almost entirely on the procurement of women who are then trained in the complicated techniques of aircraft repair and maintenance. Thirty-nine percent of our present employees are women.

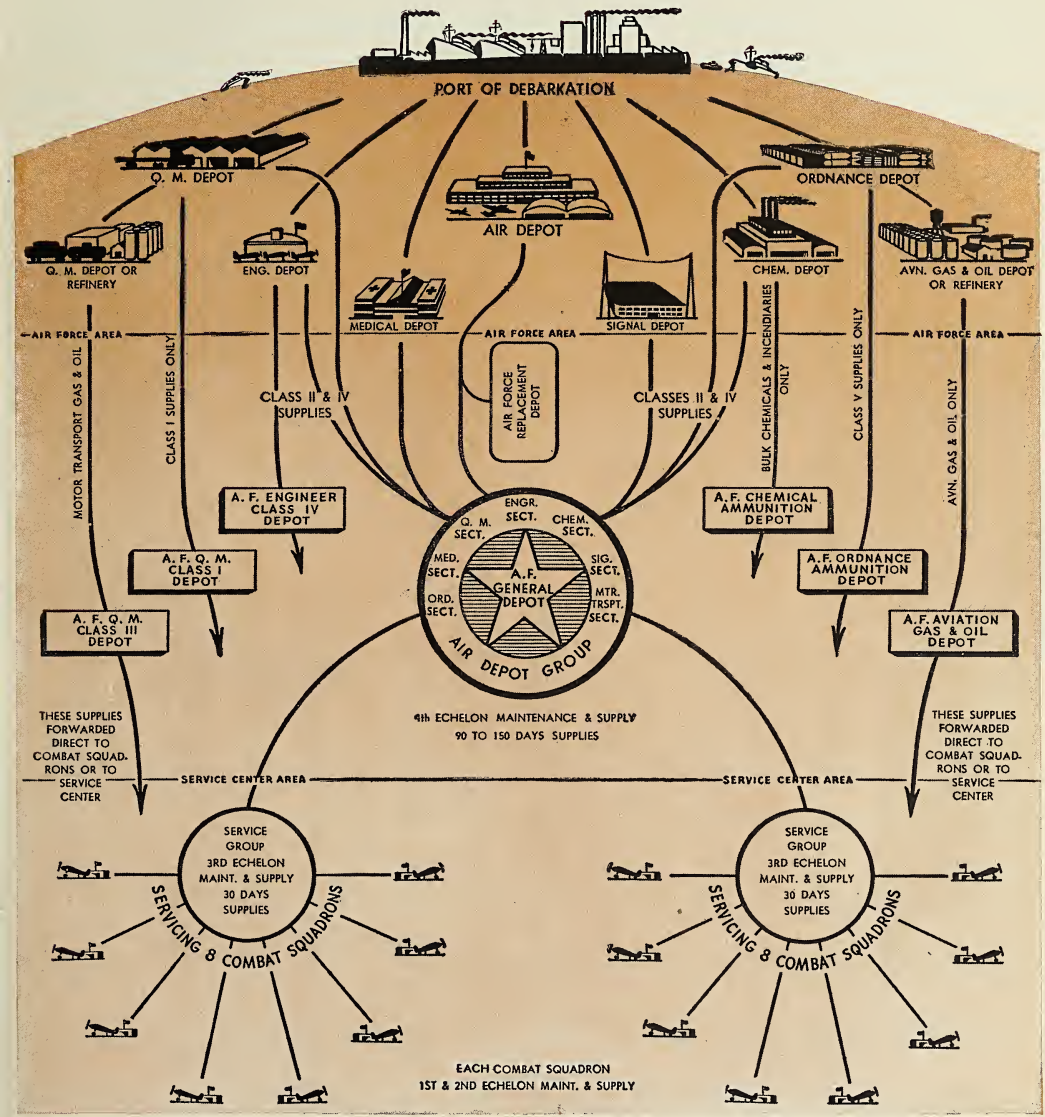
The problem of employment in the ASC is complicated by the fact that our installations are, of military necessity, removed from the large centers of population, with consequent housing and transportation problems. In the face of the many difficulties surrounding our reliance on civilian personnel for basic operations, the personnel and training division has come to be a sociological service spending almost as much time with the problems of housing, transportation and recreation as with the routine personnel procedures. But, as the largest employer of civilian personnel in the AAF, the ASC is making every effort to comply with the spirit and directives of the War Manpower Commission. The policy of utilizing civilians in order to release soldiers was adopted years ago and today every emphasis is on the improvement of functional efficiency in order to effect savings in manpower. Stenographic pools and a system of office management have been established. Occupational Standards are the basis of all personnel actions and the use of machines in all operations such as the preparation of payrolls is universal.

Yet civilian personnel does not represent the division's primary responsibility which is to furnish trained ASC groups and air depot groups for overseas service. These units are probably the largest and the most complicated of the basic organization in the AAF, if not in the whole

(Continued on Page 55)

AAF SUPPLY

IN THEATRE OF OPERATIONS



BE READY FOR ANYTHING

(Continued from Page 7)

their bodies. Soldiers who weren't killed by the blasts were finished off by Marine bayonets.

"We worked closely with the Marines and Navy all the time," explains Lanphier. "And raids would be made by groups of planes. Sometimes, for example, we would fly along at 30,000 feet in P-38s, with a flight of P-40s several thousand feet below us and perhaps some Grummans several thousand feet below them.

"We were so high, in fact, that it was entirely possible for the Grummans to get into a scrap without our seeing or knowing a thing about it. When they wanted to rib us, they called the P-38 a 'high-altitude fox hole.'

"But, seriously, everybody out there knows that the P-38 is good, and far superior to the Zero. It has an exceedingly fast rate of climb, high speed, long range and its guns throw plenty of lead. And it's pretty sweet having two engines when one gets shot out miles from home and the other brings you back."

That business of getting back, say both Mitchell and Lanphier, really taxes a pilot's ability.

In the Solomons campaign missions were long and were flown in all kinds of weather. Time and again, planes would go out on escort under extremely hazardous conditions and upon their return have to land after dark in a heavy rainstorm with no landing lights. Enemy bases were always close and the Japs always outnumbered our aerial forces by four or five or six to one.

"Both living and fighting conditions were about as tough as I want to see them," said Lanphier. "But don't forget, it's *always* going to be rugged for a fighter pilot. As this war moves into new areas our men will again have bad food and bad quarters and will again be outnumbered, probably. That sort of thing can't be helped. All you can do—as Mitch says—is be ready for it."

"That raises another point," added Mitchell. "Physical condition. I can't tell you how important it is for a man to be in shape when he gets to the front.

"In the Pacific, for example, it was terribly hot all the time. Many a man came out there in poor physical condition and got sick. You just can't fly when you're sick, though lots of them try and as a result get hurt or killed.

"Especially new men. They don't want other pilots to think they have lost their nerve. So they conceal their illness, take off when they should be in bed, and too often don't come back.

"If you are in shape and have stored up plenty of physical energy, the chances are you won't get sick at all."

Mitchell paused briefly, his face troubled and serious.

"Here's a tough thing to talk about," he said finally, "but it's the truth and should be realized. The majority of pilots who get lost are lost on their first two or three missions.

"Perhaps they grow rattled and leave a formation. Perhaps they're sick. Perhaps they don't know their equipment well enough and something goes wrong. Perhaps they are not familiar enough with the ship itself, with its climbing or turning capabilities. Acrobatics will correct this; it helps you get so used to the plane that you can do things in combat that you will never remember doing. Or perhaps they are just not expert enough at night flying or instrument flying.

"A squadron commander can and will provide last-minute training in combat work. But the prime responsibility is the pilot himself. He must take such advantage of his training here in the States that he is ready when he gets to the front.

"If he does that he has little to worry about. Our planes and equipment are far superior to those of the enemy. Our ground crews do a wonderful job of keeping the ships in fighting trim and they get a kick out of it when you bring down a Jap.

"All that's expected of you is to know how to bring them down." ☆

ANSWERS TO QUIZ ON PAGE 37

1. (b) Two .50 caliber machine guns.
2. (b) Give him a burst and let him know you see him even though you can't hit him.
3. (a) Flying by use of maps and recognition points.
4. (c) Wearing night adapter goggles for about half an hour.
5. (c) Mister Smith.
6. (d) Put it under your armpit or between your legs. 7. Spitfire.
8. (b) Watch the white caps.
9. (c) Pays out a dollar.
10. (c) Attacking a target in waves of planes.
11. (c) Sighting land when you come in from over water.
12. First Air Force, Mitchel Field, New York; Second Air Force, Colorado Springs, Colorado; Third Air Force, Tampa, Florida; Fourth Air Force, San Francisco, California.
13. (a) 2840 miles.
14. There is no navigator in a P-39.
15. (b) False. 16. (b) California.
17. (c) A composite photograph formed by matching a number of photographs of contiguous parts taken from the air. 18. Lancaster.

PICTURE CREDITS

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TARGET FOR TONIGHT...

Well planned and brilliantly executed night operations are becoming more and more important. They depend in large measure on excellent night vision—a faculty which this amorous airman obviously doesn't have.

And if he were up 12,000 *feet—without OXYGEN—his effective night vision would be only about half what it is now because of anoxia. His chances of locating that "target for tonight" would be practically zero.*

(If by now you're wondering how to kiss a girl through an oxygen mask, CHECK WITH YOUR OXYGEN OFFICER.)

More good advice: You can adapt your vision to the dark by wearing special red-lensed, night vision goggles or by staying in a dark room for thirty minutes before a night flight. Eat foods rich in vitamin A—carrots, spinach, eggs and the like. Keep your windscreens clean, and USE YOUR OXYGEN FROM THE GROUND UP AT NIGHT!

With a little study on this night vision problem you won't have to worry about the "MISS" in "NIGHT MISSION."

(This is the first of an oxygen series prepared for AIR FORCE by the Flight Control Command.—Ed.)

CAP AT YOUR SERVICE

By Lieut. Col. Earle L. Johnson

NATIONAL COMMANDER, CIVIL AIR PATROL

Now that Civil Air Patrol has become an auxiliary of the Army Air Forces, its members at more than 1,000 flying fields throughout the United States want nothing more than to be given further work.

CAP was formed a week before Pearl Harbor as a division of the Office of Civilian Defense to mobilize the civilian pilots and planes of the country for volunteer wartime duties. From the beginning, a large and steadily increasing part of its work has been of a military nature, carrying out assignments for the Army Air Forces.

A short time ago the entire organization was transferred to the War Department by Presidential order. Robert A. Lovett, Assistant Secretary of War for Air, declared:

"The transfer is a recognition of a job well done and it is motivated by the desire to make the Civil Air Patrol more directly available to perform its services to the armed forces."

What the disciplined and uniformed volunteers of the CAP can do and earnestly want to do may be briefed under the following headings:

1. Flying services including coastal patrol and light-plane courier work to relieve military personnel and aircraft for other assignments; and ground duties such as guarding airfields and planes.

2. Training of thousands who are headed for the Army Air Forces.

3. Maintaining civil aviation facilities as a wartime auxiliary and as the foundation for post-war development.

The last point could be important to Army pilots, navigators, servicemen and others who desire careers in aviation after the war is over. If home town airports become overrun with weeds, progress we all want to see will be retarded. Meanwhile, a good many Army pilots owe their lives to the fact that these fields have been kept open for landings.

The CAP has enlisted 80,000 citizens. The minimum age is sixteen and most of the youngsters join the service as soon as they are permitted. The oldest CAP pilot, A. I. Martin, is 81. He has an airport on his farm near Montour Falls, N. Y. Some of the lads who got their private licenses on Mr. Martin's farm are flying for the armed forces in various parts of the world—and there are more coming.

Approximately 100,000 private pilots, a comparable number of student pilots and 25,000 privately owned aircraft were in the United States at the time this country entered the war. The initial task of the CAP was to mobilize pilots and auxiliary workers, such as radio operators, mechanics and photographers, into a military type organization.

Under a National Headquarters staffed by a dozen officers of the Army Air Forces, a Wing Command was activated in each of the 48 states and subdivided into groups, squadrons and flights. From the wings on down, the CAP organization is composed of civilian volunteers who receive no salaries and pay their own expenses, except while on active-duty missions. Then they are paid a per diem to cover living costs and a moderate hourly rental for the flying time of their planes.

The largest and most important of CAP's active missions to date is the Coastal Patrol conducted from a series of special CAP bases along the Atlantic and Gulf coasts from the Canadian Border to Tampico, Mexico. The Patrol keeps a constant daylight watch over the shipping lanes as far out as 100 miles at sea.

Early last year, when enemy submarines began to take a heavy toll of tankers and merchant ships within sight of shore, the Civil Air Patrol was ready although its organization had just begun to function.

The volunteers came with their planes, radios, monkey wrenches, $4.98 kapok life vests and very little else except their boundless enthusiasm. With no federal funds for many weeks, though aided by contributions from the oil companies, they carried on from their improvised bases, spotted subs and summoned Army and Navy bombers to the kill until the subs were scarce in the waters they patrolled.

These "Flying Minute Men," as they were called by Maj. Gen. Follett Bradley, then Commanding General of the First Air Force, kept their secrets so well that U-boat commanders crash-dived at the approach of CAP planes, not knowing they were unarmed. It was months before bombs and depth charges were hung on these little airplanes at General Arnold's orders—and to good effect.

With the success of the first experimental bases, the protecting chain was extended, first on the Atlantic seaboard and then along the Gulf, until the last gap was closed. Thus the heavier equipment of the Army and Navy was released for other theatres or for patrols further out. By close cooperation between the Army, Navy, Coast Guard and CAP, sinkings close to the mainland were reduced month by month.

These CAP Coastal Patrols, still operating along the entire Atlantic shoreline,

have flown more than 75,000 missions involving more than 20,000,000 miles of over-water flying. They have spotted more than 170 enemy submarines and seventeen floating mines, often in the path of troop convoys. They have reported 83 vessels in distress, observed hundreds of irregularities at sea, made hundreds of special investigations and flown thousands of convoy missions.

Bombs have been dropped against 81 enemy submarines, at least two of which have been listed as definitely damaged or destroyed. These are in addition to the subs which the Army and Navy have accounted for on radio call from CAP. The patrols have located 352 survivors of ship and plane sinkings.

In the course of these missions, twenty CAP airmen have been lost at sea and four in accidents over land. Seven have been injured seriously and 79 planes have been destroyed. Flying over the ocean in single-motor landplanes is hazardous, especially in the winter when flights are maintained at temperatures far below zero. Inland there have been three fatalities on Army courier missions and three on volunteer missions, making a total of thirty CAP members who have lost their lives in the service of their country to date.

High standards of maintenance have been achieved under the most adverse conditions. By pooling their funds and by private contributions, the men on the bases have developed first-class repair centers, sometimes at sites where they have leveled fields and erected the buildings by their own labor.

They are ingenious in devising their own methods and equipment. On one northern base a remarkably successful machine for thawing out motors in cold weather was built from an old oil drum and the bellows from a forge. In high-wing planes the cabin is immediately submerged when forced down on water; to enable pilots and observers to escape under such circumstances, a lever device was invented to pull off the door hinges before crashing. Special flotation gear also has been fabricated on the bases.

The Civil Air Patrol, with an enviable record already on the books, comes to the War Department ready to take on even more work.

This CAP pilot on a training mission drops to low altitude to identify "survivors."

CAP's Southern liaison Patrol flies along the Mexican border, in cooperation with the Mexican Government, to spot irregularites and stop illegal crossings in either direction. Operating from bases similar to those of the Costal Patrol, the liaison pilots follow every bend in the Rio Grande, flying so low that they can read the license numbers of suspicious autos and give personal descriptions of individuals spotted. More than 1,000,000 miles have been flown on this service without a single fatality or serious injury to personnel. When CAP took over this job, an Army unit previously assigned to the work was transferred to other duties.

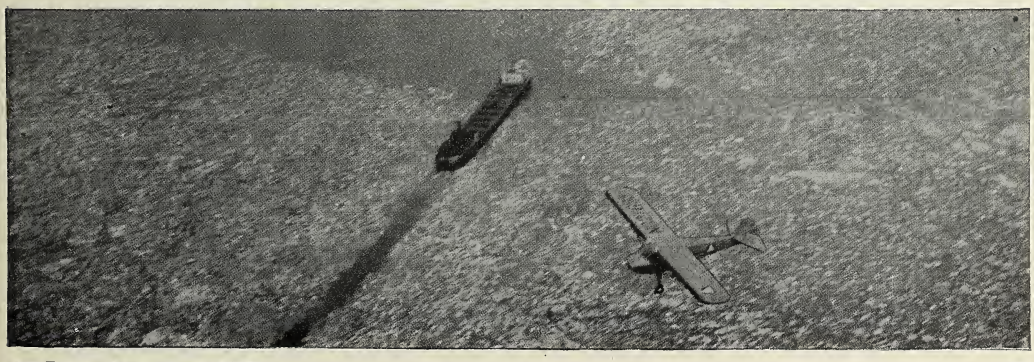
Most of the CAP pilots cannot qualify for military duty. One of the pilots on liaison patrol lost both legs flying in the last war yet, with artificial limbs, he not only flies but even marches in the drills at his base. CAP duties involve no draft exemption. Many members, hopeful of going into the Army Air Forces, are working to build up qualifying flying time and experience on CAP missions.

Potentially larger than the coastal and liaison patrols is the growing network of inland services which CAP has established. For the Second Air Force, CAP pilots coordinated by the Washington State Wing are flying on regular routes and schedules totaling upwards of 20,000 miles daily. More than 2,500,000 miles have been flown on this service to link widely separated Army posts which otherwise would have had to use Army planes and personnel at high operating costs or rely on slow ground methods.

Pilots who know the terrain fly through the mountains rather than over them, winding low along the valleys. They have carried approximately 350,000 pounds of cargo, often including urgent parts and materials, and 40,000 pouches of Army mail.

In the east, CAP planes are standing by at sub-depots ready (Continued on Page 56)

CAP plane set to drop food supplies to icebound freighter on Lake Erie. Fifty-pound bags of food were held from right window of plane on a sixty-foot line and dropped to deck as plane came upwind.



RIDING THE MESSERSCHMITT MAYTAG

By Private Charles M. Macko

Basic Training Center No. 8, Fresno, California

I had always thought that if my end as an Army pilot came, it would happen with a 20 mm shell exploding in the cockpit during fierce combat with a Focke-Wulf.

I didn't know that plenty of pilots'—or, rather, would-be pilots' careers are ended less bloodily during flight training, particularly in primary. Sometimes over half a class are victims of the Messerschmitt Maytag in the washing-out process. It may seem ruthless, but it's a way of getting only the best possible pilots to fly Uncle Sam's hot ships.

How do they determine if a cadet isn't up to the high standards and fast pace of training?

Let's recall my final check ride in primary at Thunderbird Field, Arizona.

Lieutenant Gillesby and I are adjusting our parachutes beside an innocent-looking, blue and yellow Stearman. I knew I had to give him a good ride or I would be washed. I hadn't passed the others. I was nervous, desperately determined.

The lieutenant, blonde, big, solid-looking, smiled reassuringly at me. Well, I thought, at least it's different from the movies. The lieutenant and I aren't in love with the same girl, and he isn't torn between vindictiveness and —

"Mister," the flying officer said, "I want you to relax. Then take me up, and — How many hours do you have?"

"Thirteen, sir."

"Solo?"

I shook my head.

"I see," he said. "Well, the ship's all yours. I won't take over at all unless I want to demonstrate something. You take it off, climb to 2,000 feet and show me power-on and power-off stalls. Then climb to 3,000 and do a two-turn spin. After that, gliding turns to 500 feet, and let me see some S-turns across a road. Maybe I'll pull a simulated forced landing on you. Then take me home."

I knew the routine, all right. In the past three days I had ridden with three different civilian check riders. I had been put up for check when I hadn't soloed after eleven hours and twenty minutes of dual instruction. If my landings hadn't been off, I might have soloed. Now I was being checked on all I had learned to see if I were good enough to be given additional instruction.

Now we were in the plane, the prop was turning over, and the cadet wing-walkers were throwing me well-wishing looks. I released the brakes, turned it and went S-ing toward the take-off point on the runway.

I paused just before take-off and put my goggles over my eyes. I picked out a reference point on the horizon by which I would try to keep the Stearman straight on take-off.

Muttering the old cadet war-cry, "Habba Habba," I pushed the throttle full forward. The engine roared and the plane shook, gathering speed. I pressed right rudder to correct the swing to the left due to engine torque, and pushed the stick forward to lift the tail off. I noticed I was swerving to the right. Too much right rudder. Then as I corrected, I overcorrected, and I swerved too far to the left. I was now fishtailing and bumping along the ground, almost airborne, and I was relieved when by pulling the stick back slightly I was up in the air where the ship was more easily controlled. A poor take-off, I had to admit. Get on the ball, I told myself.

In flying, you don't have to be a 1,000-hour veteran to tell if your piloting is bad. Even with my microscopic time, I could tell when I rolled out too abruptly in turns that I was not smoothly coordinated.

I was now thinking of the stalls and recoveries I'd do. It is an important safety maneuver, particularly the recognition of the exact second you are in the stall, to enable you to recover before you go into a spin. A stall occurs in almost any position, climbing, turning, where airspeed falls off and controls mush ineffectively. To recover, you should recognize the stalling point and then apply the proper correction for a recovery. In the recovery, drop your nose below the horizon to pick up more air speed and increase the engine power.

At about 2,000 feet I made some turns and banks to make sure no planes were below me. I then tried a power-on stall. What you do is set the throttle at cruising and then go into a steep climb. This I did, and soon the Stearman was shuddering uphill with its airspeed down to sixty mph. I kept pulling the stick back as the ship wanted to nose down. Then the controls began to mush. Now—!

I jerked the stick forward and shoved throttle full forward and pressed right rudder, in one motion. The nose pitched down and I held it below horizon in a glide. But, damn it, I was veering definitely to the left. I hadn't used enough right rudder. I did other stalls but somehow I just couldn't get those three movements of stick, throttle and rudder properly synchronized. The stalls were roughly executed. I was glad when I finished the last one.

I went up higher for a two-turn spin. After seeing that the area below me was

clear, I put the plane in a power-off stall, but instead of recovering, I pulled the stick all the way back, held it and then kicked right rudder. The nose dropped off to the right, and I soon was twisting nose down toward the earth which looked like a spinning platter of houses and fields.

A spin and a recovery from one is a test of many things—timing, judgment and keeping your head in a bewildering, befuddling position. In most maneuvers a gentle, silky touch is required on the controls. But in recovering from a spin you have to use smooth but definite violence.

Sure, I can tell you how to do it. Now watch me. I have started revolving to the right. I have picked a house as a reference point. It is upside down. I have gone 180 degrees around it. Now it appears right side up in the view below me. I have completed one turn. I still keep the stick back. Full right rudder. The house becomes upright again. I kick left rudder, pause a fraction of a second and dump the stick forward. The plane shudders in the stress of recovery. And now I notice, instead of gliding, I am plunging straight down in a dive. I have pushed the stick too far forward.

I pull the stick back to get out of the dive before I go into an outside loop, and for pulling back too sharply in my eagerness, Newton's law of inertia punishes me. The plane comes up but my body wants to keep going down, particularly my stomach.

LIEUTENANT GILLESBY, up front, says nothing through his speaking tube. Maybe he's too scared to talk, I tell myself humorously.

I made gliding turns to 500 feet and picked out a road for S-turns across it. I did a fair job correcting for drift, which is one of the purposes of the maneuver. I completed my turns the same distance across each side of the road.

And when Lieutenant Gillesby cut the throttle suddenly, I made a pretty good simulated forced landing. First, I put the nose in a glide to maintain flying speed, then made a turn into the wind for approach to a fairly level green field. It would have been an OK forced landing.

With throttle forward again, I headed for home and my biggest test—landing.

The idea of landing a plane is simple. Gliding in with motor idling, you merely stall the airplane a few feet off the ground.

The first problem is to fly the correct approach to the field or get into the "pattern," which changes with the direction of the windsock or tee. You first fly downwind outside the field, then make two ninety-degree turns, finally gliding down into the wind.

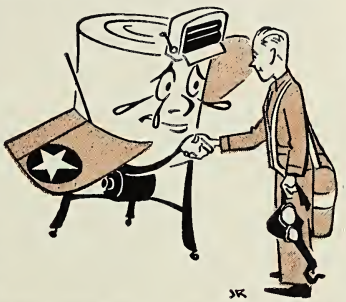
I got into the pattern at 500 feet and kept watch for other planes. I made my first ninety-degree turn, straightened out

This former aviation cadet gives a straight-from-the-shoulder account of his wash-out in primary and his feelings in the matter.

and looked rapidly for a landing lane clear of planes. I found it and then cut the motor to make my last ninety-degree turn a gliding turn. Because your airspeed is lower in such a turn, your airfoil reactions are less effective so I generously gave plenty of left rudder. I thought the ship would never stop turning. I had given enough rudder to turn a Flying Fortress. After some violent fishtailing, I finally established a straight glide down.

I watched a fixed point to see if any cross wind was causing me to drift. It wasn't. Otherwise I would have had to dip one wing slightly into the wind and use a little opposite rudder.

The ground was steadily coming up to meet us as we glided over the edge of the field. Now only about fifty feet. Shifting my eyes, I looked down below. The ground was going past in a blur. Idiot! Remember what your instructor told you: look ahead to a point where the ground doesn't blur. I did but I lost my refer-



ence point ahead. Confused now about my actual altitude, I instinctively pulled the stick back to take the plane out of glide and into a stall. But with too much airspeed left, the plane zoomed, and now I could see I was going to stall—but about twenty feet off the ground. Never a dull moment with Charlie!

I pushed the stick and the nose of the plane down to gain airspeed. I gained some but before I could pull it out of the glide, my wheels hit the ground and the plane bounced—but hard. That was unexpected and a little too fast for me. I pulled the stick back to stall it and keep the tail down, but still the plane had too much airspeed and it leaped some ten feet off the ground, then bang, down again with a terrific jar. Still worse, the Stearman began veering to the right.

Lieutenant Gillesby grabbed the controls and, in a fast blur of movement, averted a wing-scraping. He retained control of the airplane, taxiing back to the hangar. I felt ashamed of myself.

As I got out of the cockpit to talk to Lieutenant Gillesby, I knew what the decision was.

But I asked anyway, "Well, sir?"

"Mister, you don't have it. Not enough coordination. Your turns were rough. You don't match pressure on rudder and stick. You muffed your stalls because you couldn't coordinate all the movements required. I don't know the reason for that bad landing, but it was bad. Sorry, but I will have to recommend you for elimination."

THAT was straight from the shoulder. Automatically, I saluted and left. My eyes smarted, for it is damn hard to take a defeat of hopes and dreams.

My old instructor, one of the civilian flyers employed by the field, saw me in the flight room and tried to cheer me up.

"You can still fly. You just can't learn fast enough. The Army wants men who have a high degree of aptitude because they have to learn fast—first in PTs, then BTs, then ATs and finally in even hotter combat ships."

"If I only had some stick time before I came here," I mused. But then I got realistic, "But, hell, my trouble is coordination, or a lack of it."

"In that case," he said, "we are just saving you from some fatal mistakes you might have made later in a hot ship."

I was too disappointed, however, to appreciate the implication that Lieutenant Gillesby had saved my life.

I joined the other wash-outs in another barrack.

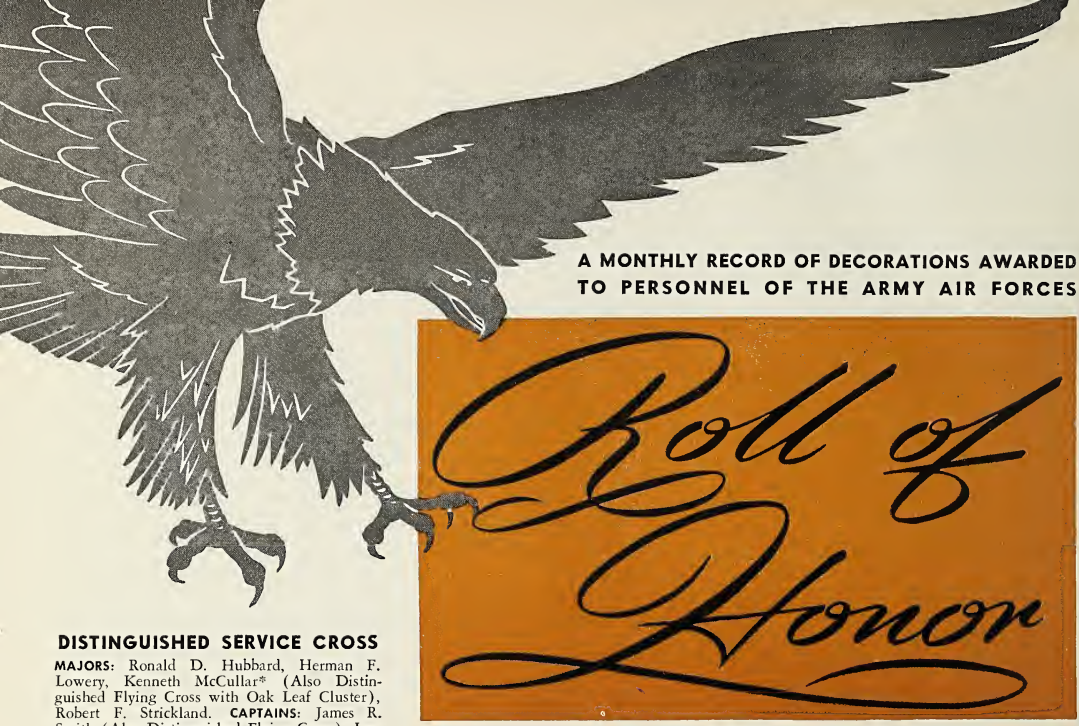
"Why did you wash out?" is the question we eventually ask each other.

The answers may be evasive as, "Oh, I gave the final check rider a rough ride," or perhaps some more bitter comments on the check riders' judgment.

Most of those who are eliminated usually fail, as I did, because of insufficient coordination. There are others who carelessly get into such accidents as groundloops and can't survive the checks given after an accident. There are some victims of airsickness. Others wash because they disobey regulations, engage in dogfights or formation flying before they are ready. A very small percentage is eliminated because they have threatened cadet officers or have overstayed passes.

The number of men who wash out always strikes one as being wasteful. Most of the boys can fly, and fairly well, too. But even I, disappointed as I am, can appreciate the Army's aim. It wants the cream of the crop to make the best pilots in the world. The standards for Army pilots haven't been lowered in this war. you don't believe it, ask those young men who have ridden the Messerschmitt Maytag. ☆

Illustrated by James T. Rawls



A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

Roll of Honor

DISTINGUISHED SERVICE CROSS

MAJORS: Ronald D. Hubbard, Herman F. Lowery, Kenneth McCullar* (Also Distinguished Flying Cross with Oak Leaf Cluster), Robert F. Strickland. **CAPTAINS:** James R. Smith (Also Distinguished Flying Cross), Iran Sussky. **LIEUTENANTS:** Bernard E. Anderson, Kenneth W. Howat (Also Purple Heart, Distinguished Flying Cross and two Oak Leaf Clusters to Air Medal), Robert G. Oestreicher. **SERGEANT** Wilbert R. Burns. **PRIVATE** Ray J. Matchitt*.

DISTINGUISHED SERVICE MEDAL

LIEUTENANT GENERAL Delos C. Emmons (Also Air Medal). **MAJOR** William G. Benn.

SILVER STAR

COLONEL Leon W. Johnson. **MAJORS:** Harvey J. Scandrett (Also Distinguished Flying Cross and Air Medal), John A. Thompson (Also Distinguished Flying Cross). **CAPTAINS:** Thomas T. Dabney (Also Air Medal), Fred P. Dollenberg (Also Distinguished Flying Cross and Air Medal), Justus A. Emens (Also Purple Heart), Curran L. Jones (Also Distinguished Flying Cross with Oak Leaf Cluster and Air Medal with two Oak Leaf Clusters), Thomas G. Lanphier, Jr. (Also Distinguished Flying Cross). **LIEUTENANTS:** John G. Brennan, Henry D. Chism, Jr., Leonard E. Edington (Also Distinguished Flying Cross and Air Medal), Paul Pestel, Byron R. Work (With Oak Leaf Cluster), R. W. Yundt (Also Distinguished Flying Cross and Air Medal). **STAFF SERGEANTS:** Fred J. Best, Adolph Buda, Clarence E. King (Also Distinguished Flying Cross), Tom P. Rogers (Also Distinguished Flying Cross). **SERGEANTS:** Arthur Karlinger* (Also Purple Heart*), Robert B. Lowrie (Also Purple Heart), Ollie Michael (Also Air Medal).

OAK LEAF CLUSTER TO SILVER STAR

LIEUTENANTS: E. J. Nossum, Horace E. Perry. **PRIVATES FIRST CLASS:** Edward Van Every, Herbert M. Wheatley, Jr.

* *Posthumous*

PURPLE HEART

LIEUTENANT COLONEL Stuart M. Porter. **MAJOR** Chauncey B. Whitney*. **CAPTAINS:** John A. E. Bergstrom*, Edward W. Robinson. **LIEUTENANTS:** Kenneth L. Alspaugh, John D. Crawford, Donald Eaken, Marshall L. Horshey, David L. Gaede, Paul J. Gruesser, Thomas L. Hayes, Jr., Arthur N. Inman (Also Distinguished Flying Cross and Air Medal with Oak Leaf Cluster), Donald J. Kundinger, Joseph F. Kane*, William A. Lorence, William W. O'Neil, Arnold W. Postelle, Burt H. Rice, Eugene A. Wahl. **WARRANT OFFICER** Jack E. Day. **MASTER SERGEANT** Edwin F. Rhodes. **TECHNICAL SERGEANTS:** Almond E. Caird, Thomas J. Coburn, Otto T. May. **STAFF SERGEANTS:** Nicholas T. Brozack, Carl A. Knutson, Myrvan R. Morley, Gerald H. Watson, Terrel Henry Wood. **SERGEANTS:** Oscar R. Billings, John G. Cottros, Archie Cothern, Eritreo E. Del Vecchio*, Ray L. Draper, Bobby H. Gordon, Russell L. Hultgren, Charles E. Stafford, William R. Whalon. **CORPORALS:** Edwin W. Burns, Jennings G. Beckwith, Angelo P. Delucia, Leonard K. Florence, Carroll J. Ferguson, Darwin A. Garrett, Harold Kissel. **PRIVATES FIRST CLASS:** Robert R. Kelley*, J. B. Sparks*, Edwin A. Tischbirek, Anderson G. Tennison*. **PRIVATES:** Jack H. Feldman*, Stuart H. Fiander*, Stanley R. Foster, Leo E. A. Gagne*, Robert H. Gooding*, Joseph Jedrysik*, Bethel L. Kniphfer, Roderick O. Klubertanz*, Otto C. Klein*, Andrew J. Kinder*, John A. Mayberry, Russell M. Penny*, Hal H. Perry*, Clarence M. Poulsen, William T. Rhodes*, Halvor E. Rogness*, Anson E. Robbins*.

DISTINGUISHED FLYING CROSS

CAPTAINS: Robert C. Beebe, Raphael Bloch, Jr. (With Oak Leaf Cluster and Air Medal), Howard Burhanna, Jr., Robert M. Creech, Robert E. Hawes (With two Oak Leaf Clusters and Air Medal with two Oak Leaf Clusters), Earl R. Kingsley (Also Air Medal with Oak Leaf Cluster), Clayton L. Peterson (Also Air Medal), Wayne H. Rathbun (Also Air Medal), Lloyd L. Reynolds, George Simmons (Also Air Medal), Richard Taylor (Also Air Medal). **LIEUTENANTS:** Malcolm K. Andresen, Walter O. Beane, Jr. (Also Air Medal), Jesse M. Bland (Also Air Medal), Hubert S. Bronson, Bernard Cederholm, Andrew Cook, Jr. (Also Air Medal), Thomas D. DeJarnette (Also Air Medal), James W. Egan (Also Air Medal), Irving A. Erickson (Also Air Medal), Cleveland D. Hickman, Glenn L. Johnson (Also Air Medal with three Oak Leaf Clusters), Robert S. Knight, Melvin C. Lewis, William G. Newman, John Y. C. Roth (Also Soldier's Medal and Air Medal), Glenn J. Schaffer (Also Air Medal with Oak Leaf Cluster), John F. Stroup, Anthony C. Yenalavage, Howard N. Young. **FLIGHT OFFICER** Wilbur M. Hackett. **MASTER SERGEANT** Gust D. Portl. **TECHNICAL SERGEANTS:** Nicholas J. Andreas, Anton J. Budgen, William Ludkiewicz, Daniel F. Morton, Jr., James R. Shackelford (Also Air Medal). **STAFF SERGEANT** Theron R. Jones. **SERGEANTS:** Jack Archer, Clarence L. Campbell (Also Air Medal), Charles J. Geyer, Albert K. Will. **CORPORALS:** Elmer F. Awtrey, William C. Myers. **PRIVATES FIRST CLASS:** Louis D. Gardiner, John R. McNellis.

OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

COLONEL Emmett O'Donnell, Jr.

SOLDIER'S MEDAL

CAPTAIN Alexis Klotz. **LIEUTENANTS:** Dale Davis, Elmer J. Gedeon, Robert Kernan, Paul M. Lindsey*, Harry Patteson. **MASTER SERGEANTS:** Howard W. Deal, George M. Dun-

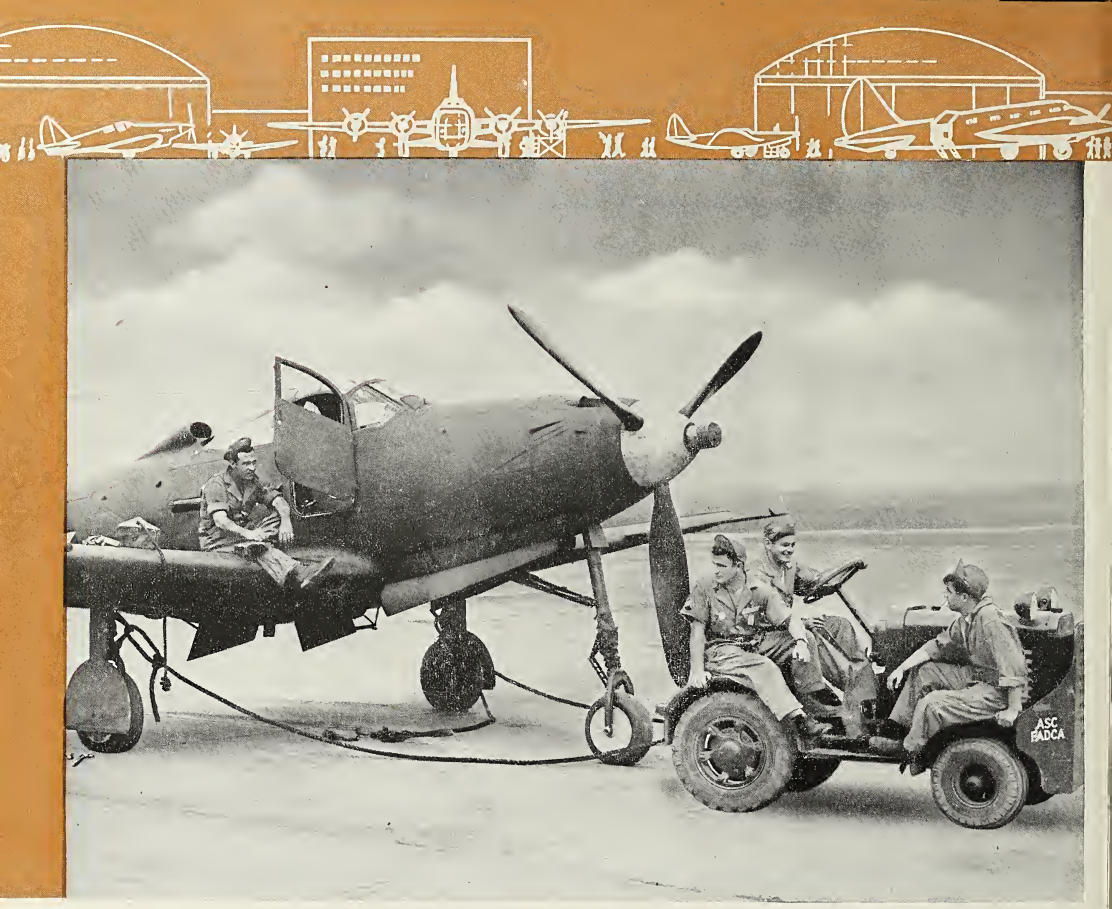
can. **TECHNICAL SERGEANTS:** Kenneth Addis, Richard J. Barrett, Jr. **STAFF SERGEANTS:** Forrest M. Beckstead, George W. Gunn, Douglas H. Logan, Clarence L. Singsank. **SERGEANTS:** Wayne C. Martin, Victor P. Minkoff, Howard S. Petersen. **TECHNICIANS FOURTH GRADE:** Edward J. Dowling, Malcolm B. Levison. **PRIVATE** Joseph W. Adrian.

AIR MEDAL

MAJOR GENERAL George E. Stratemeyer. **BRIGADIER GENERAL** Frank A. Armstrong (Also three Oak Leaf Clusters to Distinguished Flying Cross). **COLONELS:** Walter W. Gross, Kenneth B. Hobson, George F. McGuire. **LIEUTENANT COLONEL** Dale O. Smith. **MAJORS:** Donald J. Green, Francis H. Matthews, Marvin E. Walseth. **CAPTAINS:** Benjamin C. Adams, Archibald D. Anderson, William H. Arthur, James F. Berry, Edward D. Black, Howard F. Butler, George C. Cranston, Kenneth C. Dempster, Charles G. Esau, John E. Fox, John K. Hall, George W. Haney, Carl David Hoffman, George K. Hughel, Frank MacDougall Hunt, Donald M. Hyland, Virgil Ingram, Jr., Lawrence E. Jarnigan, Jr., Edward L. Jenkins, William D. Jernigan, Ralph E. Jones, Jr., Jacob P. Sartz, John Urick. **LIEUTENANTS:** Louis M. Abernathy, Lloyd Adonson, Peter K. Arpin, William E. Ayres, John A. Balaban, Junior M. Barney, Charles J. Barr, Jack Best, Rachel N. Bethune, Ralph A. Birk, David B. Bishop, William Emanuel Black, Jr., Alfred D. Blair, Raymond W. Boggs, Charles Felk, Clyde V. Knisley, Jr., Martin E. Lichle, Allan R. Lind, Herbert E. Lindhe, Marion G. Lloyd, Robert H. Long, William A. Loudermilk, William D. Lown, Raymond Lunenfeld*, Alvin M. Lusk, Raymond B. MacDonald, Donald L. McKay, Edward Joseph McPherson (With two Oak Leaf Clusters), George R. Mason, Thomas F. Magruder, Harrison L. Marshall, Paul M. Means, Orval H. Michelson, Maurice L. Minett, Howard A. Moore, Charles E. Morris, Clement K. Miller, Albert C. Naum, Edward R. Neff, Joseph H. Nesbit, Kenneth L. Ogle, Jr., Clifford R. Oliver, Ben L. Parker, Harry G. Peterson, Michael G. Phipps, Ray L. Pittman, Belah O'B. Price, Darwin E. Rasmussen (With Oak Leaf Cluster), Levon L. Ray, William J. Rhodes (With Oak Leaf Cluster), John E. Richards, William M. Riddle, Charles F. Rogers, Arnold Z. Rosoff, Hardin E. Ross, Jr., Joseph P. Schilling, Jr. (With Oak Leaf Cluster), David Herbert Schreiner, Meldrum L. Sears, Robert L. Shedden, Robert E. Speer, Arland Stanton, Roger P. Stein*, Benjamin J. Stone, Jr., Floyd F. Strohl, Don L. Sutliff, LaVern B. Terrell, Donald V. Thompson, Walter E. Thorne, Oliver E. Tilli, Fred Herman Towne, Jr., Claude A. Trotter, Jr., Robert F. Valentine, Robert C. Velan, Hussell M. Vifquain, Irving W. Voorhees, Jr., Harold E. Ward, Lucian K. Wernick, Robert W. Wert (With two Oak Leaf Clusters), Roy E. Whittaker (With Oak Leaf Cluster), Robert H. Wilder, Rayburn A. Wilks, Howard C. Williams, Jr., Raymond R. Yahr (With two Oak Leaf Clusters), Edwin A. Yelton. **TECHNICAL SERGEANTS:** Walter B. Belleville, Jr. (With two Oak Leaf Clusters), John F. Clark, Lawrence A. L. Craig, James G. Dorsey, Leslie T. Figg, Jr., Clarence W. Gilmore, Robert A. Guy (With Oak Leaf Cluster), Leslie O. Hansen, William P. Hoben, Howell G. Hubbard, Charles E. Mayhugh. **STAFF SERGEANTS:** Elmer J. Alifano, Mark A. Battles, Sebron D. Bristow, John D. Thomson. **SERGEANTS:** Francis L. Bennett, Warren Riley Bishop, Carl L. Bixby, Maxwell A. Blue, Gregory Bournazos (With Oak Leaf Cluster), Harold J. Brothers (With Oak Leaf Cluster), George A. Burke, Mervin C. Bush, James B. Cahley, Joseph F. Conchiglio, Thomas W. Crook, Jr., Jimmie N. Davis, Carmen C. Dimuzio, Clarence W. Durbin, Theodore J. Elfrink, William C. Fields James P. Fitzgerald, Jr., Curtis N. Foster, Zane A. Gemmill, Graham C. Hancock, Donald R. Hardwick, Willis D. Harris, Franklin P. Hohmann, Claude D. Hooks, Jerry D. Johnson, Donald L. Kerns (Also Oak Leaf Cluster to Silver Star), Robert Knight, Alton D. Leman, Henry T. Lukowski, Peter G. Lupica, Theodore J. Nastal, Carl C. Nelson, Stanley E. Nichols, John L. Nixon, Edgar L. Phillips, Morris T. Quate, Louis L. Romanelli. **CORPORALS:** Herman C. Detwiler, William M. Donahoo, Charles R. Dunn, Salvatore L. Ferraro, William E. Filgo, Irving W. Krause, Edward M. Lemons, William Malone, Andrew C. Mitchell. **PRIVATES FIRST CLASS:** Donald J. Raher, Charles H. Seltzer, William T. Wimbish. **PRIVATES:** Jack Holloway, Stanley A. Douglas, Philip O. McGovern, Jodie B. Thornell.

OAK LEAF CLUSTER TO AIR MEDAL

MAJOR Donald J. M. Blakeslee. **CAPTAINS:** John L. Ryan, Reynold A. Soukop. **LIEUTENANTS:** Jack Cohen, William J. Crumm, Harold E. Snider, Ashley C. Woolridge. **TECHNICAL SERGEANTS:** Karl L. Masters, Robert G. Mumaw. **STAFF SERGEANT** Harold F. Lightbown. **SERGEANT** Bernard Jurosek. **CORPORAL** Jack E. Leverone. ☆



What's wrong with this picture?

HERE we go again, mechs. Gather 'round and pick out the boners. A fighter plane is pictured this month and it seems that there are a number of things happening to this P-39 which aren't strictly according to T.O.s You should be able to spot the mistakes as easily as shooting fish in a barrel.

Naturally at advance bases in combat theatres and often in extreme emergencies in the United States, you'll find it necessary to improvise and use the ingenuity that makes AAF mechs supreme in their job. But as long as you can, it pays to use the right tools and methods for the job; those skillful tricks used of necessity in the combat theatres can only be done by mechs who knew how to do things the right way in the first place.

This month's picture was posed by men of the 88th Repair Squadron, Air Service Command, Patterson Field, Fairfield, Ohio. Left to right, they are Private First Class Joseph Buffamonte, Staff Sergeant Peter Kasprzyk, and Privates First Class Frank J. Cussio and Gene Rankin.

They deliberately acted out these boners in the interest of better maintenance procedures.

Crew Chief Kasprzyk can point out seven mistakes in the photograph. They are listed on Page 55. Can you find any more?

ON THE LINE

A monthly maintenance roundup prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

RU Conscientious About URs? . . .

Upon discovery of a failure in any part of an airplane it behooves the mech to report it. The reason for URs (Unsatisfactory Reports) is to eliminate trouble at the source, saving lives and planes as well as headaches for mechs ON THE LINE who have to cope with the defect. It's your responsibility to make use of URs.

What happens to the UR you fill out? It goes from your hands through a subdepot, a depot or field unit to Air Service Command Maintenance Division engineers. It is studied by them in addition to getting careful scrutiny by manufacturers and AAF laboratories. Frequently action is taken by the Materiel Command if design or material is involved.

Of utmost importance, URs furnish necessary information to enable corrective measures to be developed. Without them, flaws and failures may go unheeded and are repeated. Complete statistics are kept on all URs and the number of failures reported often determines the action required. The clinic studying and adjusting the faults must have representative figures on which to base its study. See AAF Regulation 15-54 for complete information on URs.

So turn 'em in, men. Those URs are a vital AAF instrument.

Maintenance at Borinquen . . .

It is the boast of many engineering officers at Borinquen Field, Puerto Rico, that the base, if necessary, could completely break down and rebuild any airplane in the AAF.

There, at one of the principal stepping stones on the route to England, Africa, the Middle East, Asia and other points, they have to be ready to service or repair every American airplane flown by the United Nations. An enlisted man or civilian at Borinquen may be called on to work on an A-20, B-17, B-24, B-25, B-26, A-29, A-30, C-54, C-53, C-47, C-87 and heaven knows what else.

The big problem is to keep abreast of supply requirements. Parts and other stock needs are anticipated far in advance and flown from Air Service Command depots. At Borinquen they do both second and third echelon maintenance and operate on a 24-hour basis at all times. Chief concern is engines but they also carefully check hydraulic and electrical systems, and, occasionally, even armor and armament.

Construction at Borinquen was begun in 1939 and the base was just about ready to operate when war broke out, having been through a period when it was little more than a tent city. In fact, experience gained there in handling maintenance work right in the open showed the feasibility of operating exposed to sun, wind and the elements.

Now there are several gigantic hangars with a German-designed roof, reinforced in a complicated manner, and supposed to be hurricane-proof and able to resist direct bomb hits.

Salt water corrosion is the great worry for mechs there, because the salt air causes corrosion in planes even when they are just parked.

Men at Borinquen recall many of the early planes to go through after the war started. These included LB-30s and B-17Es sent out to reinforce the 19th Bombardment Group in the Southwest Pacific.

Several hundred Puerto Rican civilians now work at Borinquen and have become quite proficient. They are naturally good with their hands. One, formerly an artist, is operating the plexiglas department. Another is a high-grade propeller expert and many others are skilled with fabrics.

Classes are scheduled constantly to keep all enlisted men and civilians acquainted with new developments, and training films are shown frequently.

Sharps and Flats . . .

We heard of a case in which a nail was found in the tire of an ambulance, ready —apparently—for emergency duty on the flight line. Drivers of crash trucks and ambulances ON THE LINE must make an inspection of their tires and running gear *immediately* upon arriving at duty posts. You might loll behind the wheel all day with nothing to do, but if an emergency comes up everything must click. When a crash truck or ambulance is needed, it is needed right now!

Who's Hoarding? . . .

At an AAF flying school using BT-13 aircraft, 21 tool assembly cam moving wrenches were found in storage. These wrenches are used on hydromatic propellers and no hydromatic propellers are used at that station. One wrench should have been issued to the transient aircraft crew, another to sub-depot engineering, and the remainder reported as excess equipment as outlined in AAF Regulation 65-2. Keep in mind that tools hoarded at one station probably keep planes grounded at another! ☆

The Ten Commandments

1. *Thou shalt not turn propeller without checking ignition switches.*

2. *Thou shalt not warm up engines without wheel blocks.*

3. *Thou shalt not leave airplane without checking parking brakes.*

4. *Thou shalt not leave airplane without locking controls where applicable.*

5. *Thou shalt not start engines without seeing that crew is clear of propeller.*

6. *Thou shalt not taxi airplane if not qualified to do so.*

7. *Thou shalt not clean engines inside hangars with inflammable fluids.*

8. *Thou shalt not leave cowls where they will be blown away by other airplanes taxiing or warming up.*

9. *Thou shalt not use jacks without being sure of capacity.*

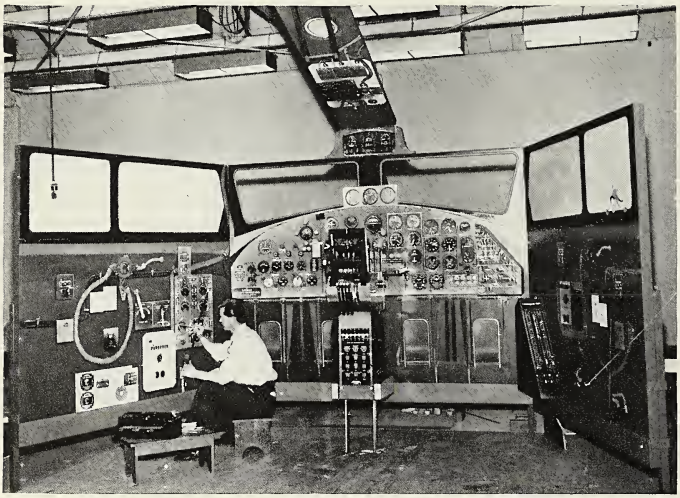
10. *Thou shalt not leave a job until a final check indicates that it is finished.*

SYNTHETIC DEVICES

THE men who deal with synthetic training devices use the term "mock-up" to describe one broad category of their wares. Generally, it may be defined as a replica or facsimile model which looks and acts enough like the real thing so that the student may use it effectively for practice or study.

Hundreds of such gadgets are in effective use in the AAF training program. Some are made in local workshops of training activities, some are factory-built. Mock-ups used for practice by students usually are life-size models. Those intended for demonstration or study may be reduced in size for easy handling or enlarged to permit effective demonstration to large classes.

Typical of this type of training device are cockpit mock-ups in current use at AAF training stations. By using models of this kind instead of the real thing, students may be familiarized with specific types of airplanes without the necessity of grounding operational equipment. The three cockpit mock-ups described and shown on this page will illustrate the possibilities of such devices.

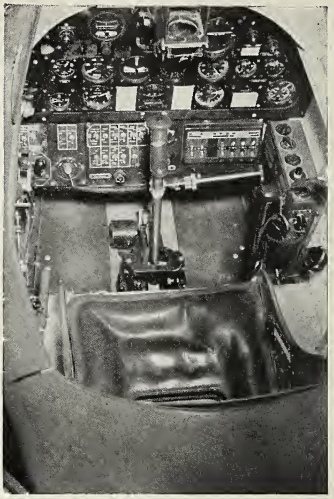


B-17F Cockpit Instruction Panel

THE B-17F cockpit mock-up shown here is actually a series of photographs, which have been enlarged and mounted on panels at appropriate points so that the whole set-up looks for all the world like a cockpit model.

The panels were designed to assist instructors at the Hobbs Army Air Field, Hobbs, N. Mex., in teaching pilots the operation and flying characteristics of the aircraft.

This method of instruction was designed and used originally at Luke Field, Ariz., about two years ago. Since that time, it has become widely recognized and many have suggested that it be made a standardized training procedure. This teaching method is supplemented by other mock-ups, charts, diagrams, training films, film strips and other training aids.



P-40 Type Mock-up Instrument Trainer

THE P-40 trainer shown here was developed by the AAF School of Applied Tactics, Orlando, Florida. Designed to orient new pilots, this cockpit has the regular P-40 instrument and switch panel, landing gear, landing flaps and cowl flap controls with functions simulating those in actual flight.

On the front of the trainer there is a complete set of controls so that difficulties in the flight of the trainer may be set up at any desired time. For example, the landing gear may be locked and the student required to make necessary correction. A fuel tank selector valve may be used to check the pilot in using the correct tank in take-off and landing.

AT-6A Cockpit Mock-up

CORRECT cockpit technique adds to the life of the airplane, engine and auxiliary equipment. To teach this technique and to provide a method by which the student may practice until good procedure is instinctive, the AT-6A panel shown here was devised.

In addition to the instruments, which simulate those of the aircraft, the student is provided an index and a set of publications for additional study.

WHERE TO GO

Information on the availability of training films and film strips, aircraft recognition materials, synthetic training devices and training literature may be obtained from the Training Aids Division, Army Air Forces, Park Avenue and 32nd Street, New York, N. Y.

THE AIR SERVICE COMMAND

(Continued from Page 42)

army. There is the task of welding all the arms and services together with Air Force personnel into a single organization. The training of such an activity is complicated by the different sources from which the men must be procured — the different sources of their technical training and technical control. If the magnitude and complexity of the ASC setup in the United States can be appreciated, then the great number of men required to perform the similar functions all over the world can be understood and the job of the personnel and training division in furnishing these men realized.

The establishment of the Command in accordance with the principles under which it was reorganized was not without its problems. A general re-education of all the personnel was involved in order to get them to appreciate the difference between technical control and command control, on which straight-line organization is based. It took some time to convert officers to the fact that a committee was not a "bull session" or a conference but a temporary unit of organization, more analogous to a board in its type of action. It was difficult reconciling straight-line control with standard Army administrative procedures which are based on the concept of posts, camps and stations rather than on a division of activity by function, irrespective of where the function occurs.

In the end the Air Service Command has profited tangibly by its new organization. The number of planes out of commission due to lack of parts or proper maintenance by the ASC has decreased. The new organization has improved our overseas activities despite a lack of adequate overseas control. Considerable reduction in estimated personnel requirements has been accomplished.

The Air Service Command is now in full swing. It is realizing the capabilities of its personnel and the system of organization it has perfected—and these are being expressed in action everyday in AAF combat operations. ☆

AIR FORCE OPERATIONS IN THE BATTLE OF ATTU

(Continued from page 23)

In addition to its observation operations, Colonel Eareckson's Liberator joined other aircraft in strafing enemy positions. This naturally called for low-level flying, much of which had to be done through fog which billowed well below the 3,500-foot mountain ridges. Some of the beach recesses into which he flew his plane to reach stubborn enemy ground positions were just large enough to permit the B-24 to turn around without crashing into one of the vertical walls.

One of these recesses was behind Sarana Bay. About sixty Jap troops, with two trench mortars and two machine guns had stationed themselves behind a small embankment facing the beach to oppose any landing in that area. Despite a 200-foot ceiling which completely obscured the top of the ravine, Colonel Eareckson twice took his B-24 into the narrow recess, banking vertically around the Jap position and materially reducing its effectiveness with machine gun fire from the nose, waist and top turret of his plane.

Although enemy troops spotted in foxholes were strafed occasionally from the air, the usual procedure was simply to make their position known to the ground commanders. In this way aerial observation aided considerably in reducing casualties caused by enemy snipers and in accelerating mopping up operations.

A striking example of the manner in which the element of chance enters into combat operations took place during the first days of the battle, when a small U. S. scouting force of some 350 officers and men who were attempting to cross a knife-like ridge in a flanking movement were observed from the command Liberator.

These troops had landed at Scarlet Beach and were working their way back of the enemy concentrations along Holtz Bay to come in from the rear just as our northern force attacked down the beach.

Observers in the command plane were aware that the scouting party was turning in too soon and was headed toward a deep, fog-filled ravine back of the west arm of the Bay. Late in the afternoon, a map giving proper directions was dropped for the troops, along with twenty parachute loads of food, medical supplies and ammunition dumped from another B-24. But the map was never received; it was found tangled in the tail structure of the command Liberator after it had returned to Amchitka.

The next day a B-24 carrying additional supplies went up to locate the party but it crashed on one of the fog-hidden peaks. On the third day, although they could not be seen through the thick fog, it was apparent that the troops had slid down the sides of the ravine and were facing the fire of the Japs who had them bottled up from the beach. Food and ammunition were dropped into the ravine through the fog until the little band was finally relieved by the advancing northern force which fought its way down the beach.

THAT little piece of paper catching in the tail of a B-24 had cost the scouts many casualties and the AAF an eleven-man bomber crew and a B-24, not to mention equipment and flying hours which might well have been spent in other phases of the operation.

This incident also serves as an illustration of the lengths to which our airmen went time after time in supporting the Attu landing. All air personnel participating in the operation did a magnificent job considering the handicaps encountered.

The work of the navigators and radiomen in taking the planes through the worst weather in the world and bringing them home again without a single major error on their part was superb. The pilots flew extremely hazardous missions day after day with coolness and efficiency. Maintenance crews, who operated under anything but ideal conditions on the ground, kept the fighters and bombers in topnotch flying trim.

To the men of the Army Air Forces must go a large share of the credit for the success of an operation which reclaimed the first piece of American territory from the enemy in this war. ☆

MISTAKES IN "ON THE LINE" PICTURE ON PAGE 52

1. Let's get on the beam, men. You know a P-39 is always towed properly with a towing bar. Reference: T.O. 01-1-50. (Incidentally, consult T.O. Handbooks applicable to each airplane for the recommended method. When a rope is called for, it's length should be three and one-half times the tread of the airplane. Reference: T.O. 01-1-50. The rope should not be around the scissors or tied with loose ends. See T.O. 01-110FB-2.)

2. What is this? The tire on the right landing gear is really soft—in fact, almost flat. Obviously this will break down the sidewalls of a precious rubber tire, and turning a corner will strain it even more. Reference: T.O. 04-10-1.

3. We don't like to keep harping on this, Sergeant, since other crews in previous pictures have made the same mistake. But, once more, no objects should be placed on the wings. This applies to those chocks you have there and also to the mech peacefully seated thereon.

4. Wanted for safety: Men walking, one at each wing tip. We can't see the right wing tip but there's no one out at the left.

5. Say you, were you raised in a barn? The cockpit door is open, and it should be closed while the airplane is being towed. What's more, a man should be at the controls.

6. Oh, oh. One prop blade is pointing downward. Surely at least one of you four mechs knows that when towing an airplane with a three-bladed prop, one blade should always be at twelve o'clock.

7. And what about you two extra men on the tug? Did you come along just for the ride? If you don't have anything else to do, you could be out at the wing tip.

CAP cadets at Des Moines, Iowa. Upon graduation from high school, many CAP cadets enter the AAF for further training.

CAP AT YOUR SERVICE

(Continued from Page 47)

to fly emergency shipments where they are needed. Tracking missions to give practice in sighting to anti-aircraft gun and searchlight crews, tests of the aircraft warning system, camouflage inspections, blackout observations and other miscellaneous missions involve thousands of miles of flying each week.

Searches for lost Army planes are conducted by CAP as a matter of regular routine in many regions, especially in the west. Flying slowly and at low altitudes, with pilots and observers trained in methods of precision reconnaissance, the CAP puddle-jumper planes find what they are looking for. In one instance, wreckage was found by looking up rather than down. This Army plane had crashed along a canyon wall.

Many CAP squadrons have developed elaborate ground units with transportation, first aid and communications facilities. The Nevada Wing has formed some excellent cavalry units to go to the scene of accidents spotted in the mountains from the air; it also has motorized and foot auxiliaries. The New Hampshire Wing has ski units for the same type of missions. Michigan has parachute units.

The purpose of CAP has been to get ready for missions that will be useful to the Army Air Forces. Volunteer flights and squadrons in all parts of the country have drilled, trained and conducted practice missions so that every member will know what to do in emergency.

On many occasions when Army planes have been in distress, this CAP ground training has resulted in a safe landing for the aircraft. One evening in an Ohio town, a private pilot and his wife, both CAP members, heard a plane circling overhead. They notified the police and fire departments. A field was illuminated. They flashed landing directions with an auto spotlight in a code they had learned in CAP classes. After the Army pilot had landed, it developed that he had been in CAP and had learned the Morse signaling that saved him from a crash.

Cavalry unit of the CAP Nevada Wing en route to search for lost Army plane.

The Coastal Patrols have made possible the rescue of more Army airmen than the total of their own losses. The survivors of the "ghost" plane which flew to Mexico after the crew bailed out off Florida were first spotted by CAP planes. Near a northern base, when an Army fighter pilot bailed out and was injured, his crashing plane set the woods afire. Skimming the tree tops through the smoke, CAP pilots located him just in time for a rescue.

BACK of these missions is the intensive training in military procedure, aviation and civilian defense subjects which is required for all members so that flying personnel will learn military discipline and ground workers will understand the fundamentals of flying. While CAP does not give flight training, its courses cover much more than the requirements of a private pilot's license. Members are encouraged to learn to fly at their own expense and thousands have done so in the CAP program.

Practice flying missions include area searching, bombing with flour bags, picking up messages and dropping supplies by paper parachutes. Mobilizations and maneuvers are practiced. Since there have been no enemy air raids yet, CAP units have not been called on for the home-guard duties for which they were originally formed. But many a squadron has shown what it could do by going into action during floods and other natural disasters, performing aerial reconnaissance and relief duties as well as guard and labor tasks on the ground.

In addition to missions for the Army, CAP conducts extensive courier services for war industries. Often, by rushing in vitally needed supplies, the stoppage of assembly lines at war plants has been averted. Recently the departure of a fleet of Army trucks was delayed by lack of a shipment of tie rods. A CAP courier plane from Cleveland dropped the parts by paper parachute and saved many hours.

Through its training program and its detailed files of personnel, CAP has been able to furnish many specially qualified men on request from the armed forces; upwards of 15,000 of its members have gone into various branches of the service, including the Army, Navy and Marine Corps, as well as into flight and ground school instructor jobs and to the airlines.

CAP women members, comprising about ten percent of the total enrollment, have gone into the WAACs, WAVES and WAFS. The commandant of the Marine Corps Women's Auxiliary, Major Ruth Streeter, is a former CAP officer.

CAP units in all areas are now engaged in a drive to find well-qualified aviation cadets for the Army Air Forces and encourage them to visit cadet examining boards. The CAP has its own cadets, in addition to its regular organization. Each local CAP squadron or flight is authorized to form a counterpart unit of cadets—boys and girls in the last two years of senior high school. Hundreds of these units, with a membership of approximately 20,000, have been formed. The young people get the same drill and training as the adults in CAP and are thus given a running start for military service.

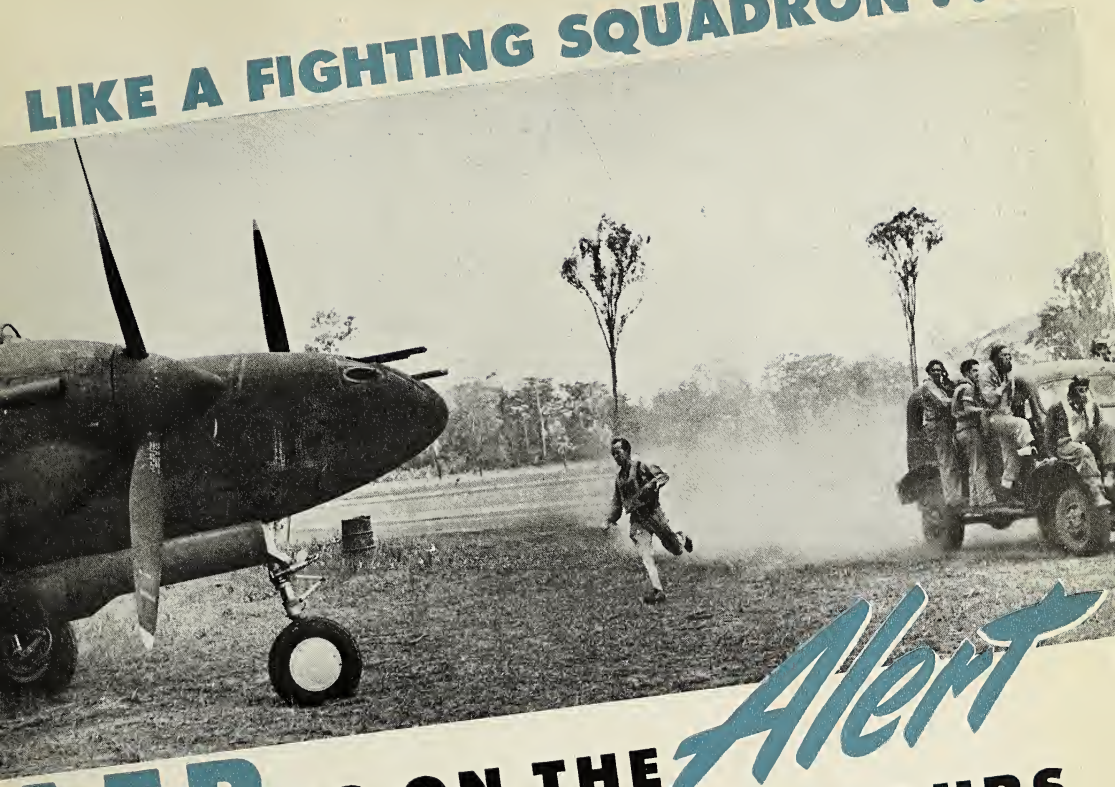
CAP members are authorized to wear the Army uniform with red shoulder loops and silver CAP insignia as distinguishing features. Officers of the patrols and inland units are commissioned in CAP with ranks up to major.

Because these men who cannot go to war are doing their duty on the home front, there is reason to hope that the post-war development of aviation will be much more rapid than otherwise would have been the case. In addition to the big airlines and flying boats which will encircle the globe in peacetime commerce, it is predictable that a great network of feeder lines and air-mail pickup services, together with a great volume of private flying, will be developed with light planes, gliders and helicopters.

In the tens of thousands of aircraft which thus can be used there will be opportunities for many thousands of the demobilized members of America's military air services. That is one way in which CAP, by maintaining local air progress even in the grounded areas where civilian flying has ceased, is trying to do a service for every member of the AAF. ☆

Printed in the U. S. A.

LIKE A FIGHTING SQUADRON . . .



AER IS ON THE *Alert* FOR YOU AND YOURS

Army Emergency Relief is available at ALL times to ALL military personnel regardless of rank, grade, branch or component — and to their dependents, regardless of relationship.

AER may be consulted on all problems involving the personal affairs of a soldier and his dependents. When assistance or advice is needed, contact the Army Emergency Relief Officer at your station; dependents may apply at the nearest Air Force station, Army camp or direct to the Air Forces Branch of Army Emergency Relief, 703 Maritime Building, Washington, D. C.

Assistance may be in the form of a loan, cash grant or relief in kind, depending on the nature and worthiness of the case. AER will also aid in arranging for prenatal care and hospitalization of wives of Air Force men, for hospitalization of dependents, and for employment of dependents and discharged personnel.

When in need of assistance . . . Contact

AIR FORCES BRANCH
ARMY EMERGENCY RELIEF

Yes YOU can still apply for AVIATION CADET TRAINING

Enlisted men between the ages of 18 and 26 inclusive (whose organizations have not been alerted for foreign duty) are eligible to apply for air crew aviation cadet training. An enlisted man interested in becoming a bombardier, navigator or pilot should submit his birth certificate and three letters of recommendation together with a completed application, Form 60, through his commanding officer. The application blanks can be obtained from C O 's or from the nearest aviation cadet examining board, U S O club or recruiting office. Successful enlisted applicants who pass their mental and physical tests and qualify before the aviation cadet examining board are eligible to receive air crew training. (Officers below the rank of captain who meet the age requirements are also eligible to apply.)

Army regulations (AR 615-160) provide for transportation, at government expense, of enlisted applicants for air crew training to the nearest aviation cadet examining board to determine qualifications.

NOTE: Your seventeen-year-old friends who also would like to apply for this training may do so now by qualifying before an aviation cadet examining board. Successful applicants will be enlisted in the Air Corps Enlisted Reserve and called to active duty after reaching their 18th birthday.

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

OCTOBER 1943

Vol. 26 No. 10

OCTOBER 1943

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AIR FORCE
THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

October Brief

ALLIED OCCUPATION of Kiska Island on August 15 marked the fall of the last Jap foothold on American soil and set the stage for future aerial operations against the heart of the Japanese empire. The steady pounding of Jap-held bases by bombers and fighter-bombers of the 11th Air Force was one of the decisive factors in eliminating enemy forces in the Aleutians. A nine-page "On To Tokyo" section in this issue describes the highly efficient work of the 11th Air Force, the natural obstacles confronting its personnel and some sidelights on life in the Aleutians. The material in this section, which begins on Page 13, was written or compiled by Maj. Jo H. Chamberlin, Headquarters, Army Air Forces, who recently returned from the Aleutian theatre.

WHEN A NAGA headhunter in northern Burma speaks of a "double airplane which drops half — BOOM," he is referring to the P-40s of the 10th Air Force which pack 1,000-pound bombs in order to do a cleaner job on railroad bridges and similar targets in Jap-occupied Burma. The work of these "B"-40s is described on Page 5 in an article by Capt. Luther Davis of the 10th Air Force.

COL. FRED M. DEAN, former CO of a Spitfire group which took a prominent part in the Sicilian campaign, states that the Axis air opposition to our invasion forces in Sicily was nothing short of "feeble and futile." Colonel Dean, 26-year-old member of the West Point Class of '38, writes of the decline of the Luftwaffe in an article on Page 6. His group saw the caliber of German air power tail off, from its peak days over western France, in Tunisia, Pantelleria and, finally, Sicily.

TWENTY-FIVE combat missions in three theatres, bombing raids on land targets and submarines and scraps with enemy fighters without a crew member being scratched or an enemy bullet once piercing the skin of their bomber—that is the combat record of the "Dream Crew" described on Page 8. Moreover, the B-24 of the story had the fewest turn backs for mechanical reasons of any ship in her group. The account of this remarkable plane and crew was written by Capt. Arthur Gordon of the 8th Air Force.

EARLY THIS SUMMER, William Howard Stovall, Jr., was accepted for pilot training. When he received a letter of congratulations from his father, Col. William H. Stovall of the 8th Fighter Command in England, he turned the pages on some of the soundest advice ever offered an aviation cadet. Colonel Stovall, who was credited with destroying eight German planes during the first World War, showed the letter to Brig. Gen. Frank O'D. Hunter before posting it to his son. General Hunter added a note and, in turn, passed the letter along to several other officers in the command, each of whom addressed a memo to young Stovall. In the belief that the contents make worthwhile reading for all AAF personnel, AIR FORCE has received permission to publish the letter and the enclosures. They appear on Page 10.

The Front Cover

This month's cover photo shows a sky full of vapor-trailing B-17s approximately 25,000 feet over occupied France, en-route to bomb Nantes. The picture was snapped with an inexpensive box camera (No. 620 film) by Staff Sgt. Douglas C. Glover from the radio operator's gun position in one of the bombers on the mission. The object in the foreground is the top of an ammunition can. Staff Sgt. Ray W. Armstrong, ball turret gunner, brought the picture along when he returned home recently to have a try at pilot training.

TEACHING aircraft recognition to ground observers in the Aircraft Warning Service is resulting in a fifty percent decrease in calls to over-taxed filter centers. How the ground observers are "taking to" their recognition training is described in the article on Page 37.

HOW is your AIR FORCE Quiz score? Are the questions too tough? Too easy? Do you have any questions you would like to see included? Try a hand at this month's quiz on Page 39 and let us know what you think of it.

AIR FORCE (formerly the Air Forces News Letter) is printed monthly by authority of Army Air Forces Regulation No. 5-6, Sept. 6, 1942, and with the approval of the Bureau of the Budget, Executive Office of the President. AIR FORCE is published by the U. S. Army Air Forces at the AIR FORCE Editorial Office, 101 Park Avenue, New York 17, N. Y., U.S.A., for use of personnel of the Army Air Forces and allied activities, and is not to be republished in whole or in part without express permission. Direct communication with this office has been authorized on matters of editorial content, circulation and distribution. Tel., MUrray Hill 5-1951; Teletype No. NY 1-2530; Director, Lieut. Col. James H. Straubel, A.C.

CROSS COUNTRY

The growing use of Automatic Flight Control Equipment, and other developments within the Army Air Forces.

THE growing use of Automatic Flight Control Equipment, through which the bombardier actually operates the plane on the bombing run, is helping to make our precision bombing more precise.

The equipment itself is far from new, but early in the war modifications of our bombardment aircraft were occurring rapidly, and operational difficulties with AFCE were apparent. Experimentation continued in this field and gradually, through the cooperation of experienced bombardment officers and manufacturing specialists, the major difficulties were overcome.

Finally, seven teams of pilots and bombardiers were sent by Headquarters to the various fronts — England, Africa, India, China and the Pacific — to acquaint bomber crews with the improved equipment and test it under battle conditions.

The results of these tests have come in; AFCE has proved itself. On many fronts every bomber formation going over a target is being flown by AFCE.

Along with this development have come new methods of computing drift, dropping angle and length of run, plus new methods of using the computer to obtain figures quickly for any given heading.

One outcome of this combined refinement of our bombardment technique has cut down the vulnerability of our planes to enemy anti-aircraft fire. The effectiveness of such fire is directly related to the time consumed in the bombing run. The time now needed for a run is so brief that it would have been unbelievable a year ago. Single aircraft have made approaches with runs of only eight seconds. Formations take longer, of course, but their elapsed time also has been drastically cut.

But the greatest contribution of the AFCE principle is improved accuracy. It has been found that application of the principle reduces the mean error, even of experts, by fifty percent. To illustrate: if the mean error is cut from 1,000 to 500 feet, the result is to *quadruple* the effect of the bombing.

It means that nine planes can do the work of thirty-six; return trips over the target are cut to a minimum; fewer lives are risked; less effort is expended; less equipment is needed to accomplish a mission.

Reprints of the Back Cover

Shortly before this issue of AIR FORCE went to press, an officer of one of the AAF commands was visiting the office when he noticed a proof of the back cover, which depicts the "Salute Proudly" theme. He immediately requested a number of reprints for posting throughout his organization.

As a result, a limited quantity of back cover reprints have been made available for general distribution upon request to the Service Division, AIR FORCE Editorial Office, 101 Park Avenue, New York 17, N. Y. Requests will be filled on a first-come-first-served basis, so respond early if you're interested.

Personnel Redistribution Center

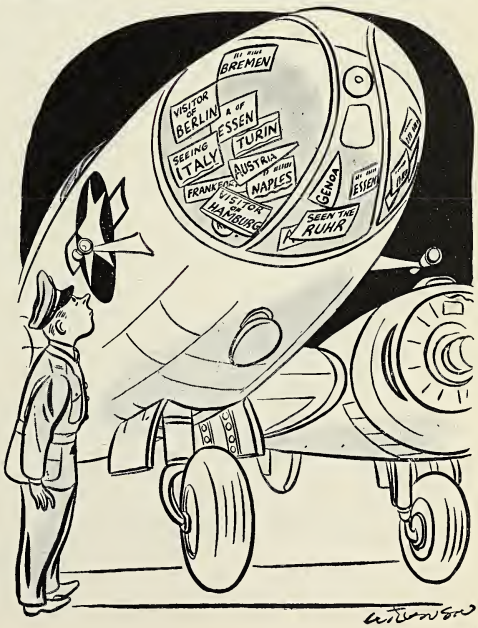
Officer and enlisted personnel returning to the States, except those returned for hospitalization or specific assignment, will be reassigned through the Personnel Redistribution Center established several weeks ago. Those discharged for medical reasons will be assisted in their return to civil life through various government agencies.

Redistribution stations have been set up at Atlantic City, N. J., and Miami Beach, Fla. A third station will be established later. Rest camps for AAF personnel will be operated at Lake Lure, N. C., Camp Mystic, Tex., and Castle Hot Springs, Ariz.

The Personnel Redistribution Center is under the direct supervision of the Assistant Chief of Air Staff, Personnel, at Headquarters, Army Air Forces.

General Stratemeyer's New Post

Maj. Gen. George E. Stratemeyer has been named commanding general of the Army Air Forces in India and Burma and advisor to the commanding general of



U. S. Army Forces in the India-Burma-China theatre. General Stratemeyer's present duty followed service as Chief of the Air Staff at Headquarters. The new commanding general of the 10th Air Force is Brig. Gen. Howard C. Davidson, succeeding Maj. Gen. Clayton L. Bissell, whose new assignment had not been announced at press time.

New Chief of the Air Staff

The new Chief of the Air Staff is Maj. Gen. Barney M. Giles, who was Assistant Chief of Air Staff, Operations, Commitments and Requirements, prior to this assignment.

General Giles, who rose from the grade of private, served with the 168th Observation Squadron in World War I, and was one of our first four-engine pilots. He is a former commanding general of the 4th Air Service Command, 4th Bomber Command and 4th Air Force.

Serving under General Giles as a new Deputy Chief of the Air Staff is Brig. Gen. Edwin S. Perrin, who succeeds Maj. Gen. Thomas J. Hanley. General Perrin has served as military air observer in the Middle East, and prior to his new assignment was commanding general of McClellan Field. General Hanley is now the commanding general of the Southeast Air Force Training Center.

Succeeding General Giles as Assistant Chief of Air Staff, Operations, Commitments and Requirements, is Brig. Gen. Howard A. Craig, who prior to his assignment served as Chief of Staff for the Mediterranean Air Command.

Blind Firing

Extract from a combat report:

"Saw JU-88 above cloud. I dived and closed to about 1,000 feet, fired from line astern as it entered cloud. Fired five-second burst into cloud at point aircraft last seen. An aircraft was seen to crash near this position at approximately the same time.

"Comment—Very interesting. Reminds us of the story of a fighter pilot in a dog-fight who lost his opponent and in desperation fired a long burst into the sun and the ME-109 fell out in flames."

PIF Simplified

You wouldn't know the Pilots' Information File these days. The File has been condensed into a single 240-page book containing all the essential information you used to have to hunt for in the old maze of tiny print. More than that, it's now in large clear type with photographs, colored illustrations and cartoons on every page.

And instead of the old system of indexes and cross-indexes, it has an ordinary table of contents which tells you where to find what.

The new PIF will not teach you how to fly and will not serve as a substitute for the Transition Flying Index which still includes the handbooks and technical orders relating to specific equipment, but it is made up of all the general information required by pilots flying any equipment.

The Flight Control Command produced the original book and has the job of seeing that it is kept up-to-date, so the pages are loose-leaf and the index is worked out to permit day-to-day revisions and additions.

Any suggestions of new material for the book should be sent to the Flight Control Command, marked for the attention of Chief, Pilots' Information File Section, Headquarters Region No. 10, Building 145, Patterson Field, Ohio.

Just Being Neighborly

Kelley is as Irish as his name. He's a private first class in the Army and his particular assignment is driving a truck on a 120-mile round trip each day up and down the side of a Central American mountain, carrying passengers and supplies from a Coastal port up to the Army airport, from which bombers go daily to patrol the Pacific and guard the approaches to the Panama Canal.

Under ordinary circumstances you might never have heard of Kelley. But the route of his truck takes him twice daily through a native town, and somewhere in the past —Kelley won't say just when—he was attracted by the charms of the local belle who ran a soft drink stand alongside the village market. Kelley speaks no Spanish and the girl no English, and their courting has been mainly a battle of eyes. But it has developed and grown in spite of these linguistic barriers.

As regular as a clock, each morning just as dawn is breaking through the mountain passes, Kelley will bring his 2½-ton truck to a halt before the door of the refreshment stand and out he will pop for a fifteen-minute break. Out will come his passengers from the rear, several on each trip, and coffee is the order of the day.

On the afternoon run, back up the mountain, the stop is made again. This time it is "cokes" for refreshment. His girl is always there, neat and pretty and glowing under Kelley's glances.

Day in and day out, this routine is never varied and the legend of "Kelley and his girl" has spread to every AAF base in the Caribbean. Many are the tales told of her beauty and charm, and the way she can be seen leaning out the window of her stand, watching, waiting for the first sight of the khaki colored truck and Kelley as they approach.

But more important still is the attitude of the townspeople, who looked at first with disfavor upon these loud and boisterous "Americanos."

Long since now have they taken the story of "Kelley and his girl" to their Latin hearts, and it is not uncommon for a small crowd to gather at the windows or stand shyly in the doorway while Kelley and his friends have their coffee or their cokes.

And they always have a smile and a nod of greeting for the departing "Americanos"—thanks to Kelley and his own private "good neighbor policy."

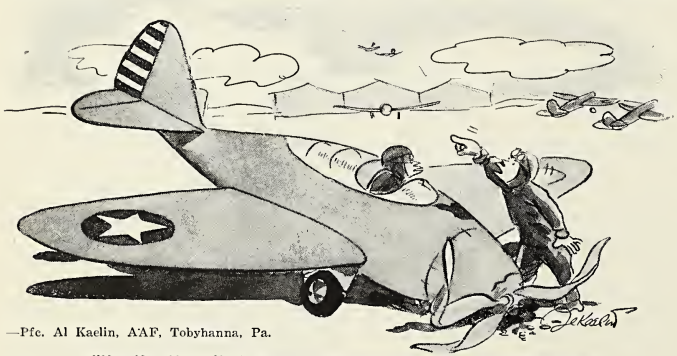
Setting the Stage

What is the Air Corps? That was the question Playwright Moss Hart had to answer when he eagerly accepted General Arnold's request to do a show about the Army Air Forces.

The answer had to be boiled down to fit a stage, had to be portrayed by a relative handful of men, had to present the emotions and realities of every man in the Air Forces, whether he was sweating out a ship in a fox hole or sweating out enemy tactics 15,000 feet upstairs.

Irving Berlin found the answer to such a question when it was asked of the Army. He went to live at Camp Upton, N. Y., where he had been an EM in the last war. He emerged with the smash hit, "This Is the Army."

But Moss Hart couldn't find any one installation, or even a few installations that reflected the complexities of the Air Forces. So he traveled around for 15,000



—Pfc. Al Kaelin, AAF, Tobyhanna, Pa.

"No, No, Myers!! A three-point landing should include the tail!"

miles or so in a bomber. He lived and flew with men working in every type of job in every type of installation in the Air Forces.

When he finally sat down to write two months later, Hart had gathered so much material he was almost at a loss to know where to begin. Then the next problem presented itself. How was he going to do the show? Irving Berlin had used songs and sketches. Noel Coward had utilized all the tricks of the motion picture to tell a story of the British navy, "In Which We Serve."

The competitive angle didn't bother Hart. He was concerned chiefly with squeezing all the material into three hours on the stage. The result is a dramatic play, with music, in 21 scenes. The music is an integral part of the show, much as it was in Hart's most recent hit, "Lady In the Dark."

The actors, the orchestra and all backstage personnel were to be recruited from AAF ranks. During the past month and more, extensive tryouts have been held at Air Forces posts to select men who could qualify and who could be released from their present assignment for temporary duty with the show.

Selected personnel were ordered to New York City for final auditions beginning September 15. Rehearsals were scheduled to start October 4. The show opens November 1 in Boston for two weeks, then goes to Washington for a week of final polishing. Broadway will see it the last week in November.

Is the show good? You'll probably get a chance to judge for yourself, since it is almost certain to wind up as a movie. Moss Hart won't commit himself about it. He says he only hopes it begins to be as good as the men of the Air Forces. But his closest friends, who have read all his other shows before production, say this is Moss Hart's "best."

Wing and a Prayer

Two of her engines were knocked out in a raid on Schweinfurt, Germany. For 500 miles "Battlin' Bobbie" hedgehopped over trees, rooftops and enemy pillboxes, spraying everything in sight with .50-caliber bullets, except when she passed over a prison camp at fifty feet and the captured men rushed into the yard to cheer and wave her on. And while the plane limped along, her crew was praying that the two smoking engines wouldn't blow up. "We made a chapel out of that airplane today," said Tech. Sgt. John Thomas after they finally reached home

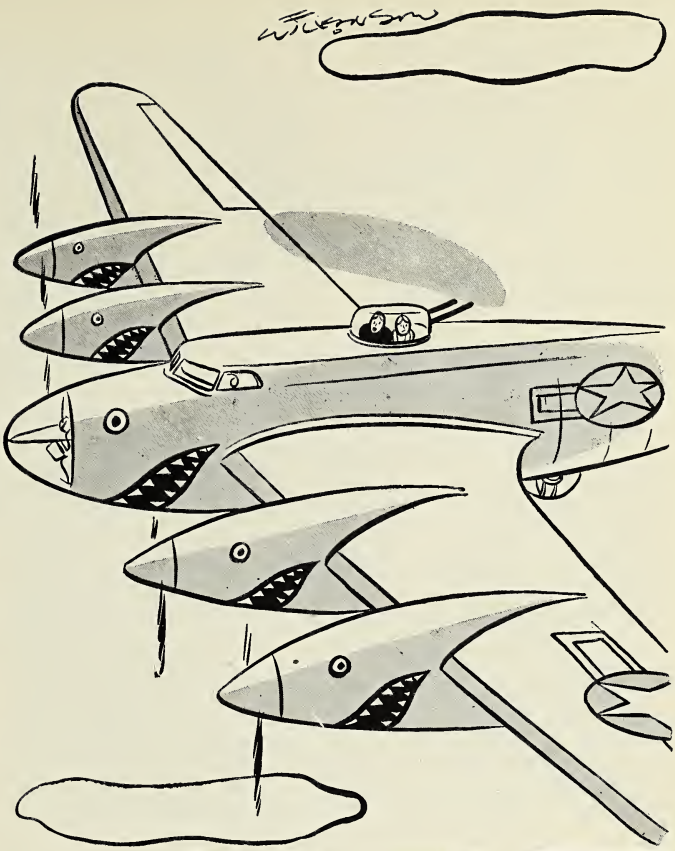
The Air Age

After three airmen of the 60th Troop Carrier Squadron bailed out of a glider recently over one of our southern states, they landed without incident and were soon walking down a winding, dusty mountain road. Around one of the turns they came upon a group of the natives, shoeless and wearing tattered hats, sprawled by the side of the road eating watermelon.

"You them fellers that just come down?" drawled an old man in the group.

After he was answered in the affirmative, the old timer bit off another chunk of watermelon and continued, "Ma said she seen some white things in the air. Ma never seen a parachute afore, but she figgered that's what they was."

The old man pointed out the way to town and went back to his watermelon. The boys hiked off down the road. The others on the roadside didn't even bother to look up.



"Don't you think we're overdoing it?" —FRITZ WILKINSON

Parachutes: Lost and Found

Our parachute "business" is picking up. Seven stations report missing parachutes and another two unclaimed chutes in its possession. A little checkup has revealed that these announcements in AIR FORCE result in a number of lost parachutes being returned to their proper stations. We invite all units to utilize this medium for locating missing or lost parachutes. Here is the latest list:

Lost:

Numbers 36-2020, 36-2035, 37-251 and 36-2061 (all Type S-1); return to Post Operations Officer, AAF Technical School, Chanute Field, Ill.

Numbers 42-411448 and 42-387531; return to Operations Officer, Headquarters and Headquarters Squadron, Flight Control Command, Smith Reynolds Airport, Winston-Salem, N. C.

Number 42-63119 (Type S-1); return to Base Operations, AAF Proving Ground Command, Eglin Field, Fla.

Numbers 42-187970, 42-2176, 42-2163, 41-19774, 41,7924, 41-19790, 41-7939, 41-7944, 41-11211, 41-19765 and 41-19788; return to Parachute Officer, Luke Field, Ariz.

Numbers 41-29333 and 41-29335 (lost at Middletown, Pa., on or about April 17, 1943); return to Headquarters, 127th Liaison Squadron, William Northern Army Air Field, Tullahoma, Tenn.

Number 41-27706; return to Base Operations Officer, AAF Basic-Advanced

Flying School, U. S. Military Academy, Stewart Field, West Point, N. Y.

Number 42-92222 (detachable type); return to Operations Office, Headquarters, Midwestern Procurement District, Municipal Airport, Wichita, Kansas.

Found:

Numbers 42-9992 and 42-544842; now held by the Parachute Section, Luke Field, Ariz. They may be obtained by contacting the parachute officer at Luke. The chute Number 42-544842 was found in an airplane crash and is beyond repair.

Logistical Study

The war offers no greater single challenge than the movement of men and materiel to the right places at the right times. We speak of this as the Battle of Supply; logistics is the formal name.

Well underway in the AAF is the first overall study of the entire supply problem as it pertains to air operations. It is being conducted by the Air Service Command and the AAF School of Applied Tactics, working closely with Headquarters.

The results of the study will be used as a basis for future supply operations. The project involves many important factors. Safety measures to eliminate improper loading have been carefully weighed. Suggested improvements in the movement of heavy items are being given every consideration to prevent costly shifting while in transit. Standardization of packing and crating is being effected. Practice in loading and unloading aircraft engines under varying weather conditions is being recommended for personnel engaged in this work. Specific studies include the movement of an AAF Group under simulated combat conditions to determine major problems and iron out the rough spots right down to the last detail.

The first comprehensive results of the studies were to be made known in the form of a manual, scheduled for distribution by mid-September to squadron levels.

Lapel Buttons

Officers and enlisted men honorably discharged from the Army during the present war will be awarded lapel buttons to signify their service to the nation.

The button is made of plastic material with gold plating, eliminating the use of critical materials. Its design is simple, a dexter eagle within a circle with the wings extending beyond the circle's edges.

Not yet available for distribution, the buttons are in the process of manufacture under the direction of the Quartermaster Corps. Full particulars will be publicized when a sufficient number have been manufactured so that eligible persons will know how to obtain them.

WASP for WAFS

By the time some of you read our story on the WAFS in the last issue, you probably were aware that the title of that organization of women pilots of the Army Air Forces had changed. Announcement of the change came after press time.

The official name of the women's pilot organization is now the WASP, short for Women's Air Force Service Pilots. The WASP will include the WAFS plus all other women pilots likely to be engaged in flying jobs other than ferrying.

The age limit for entrance into the WASP has been changed from 21 through 34 to 18½ through 34. Thirty-five hours of flying time is still required for entrance. Applications are taken by the Director of Women Pilots, Headquarters, Army Air Forces, Washington, D. C.

Table Maneuvers

You who have had overseas experience know how strange the commonplace things of other countries can be. So do some of our Allies. Take corn (of the on-the-cob variety), for instance.

During a tour of this country, members of the British First Composite Anti-Aircraft Battery were frankly puzzled as to methods of attacking this article while messed at a base. After a few futile stabs, one of the visitors asked the correct procedure for eating corn.

"Just hold it in both hands," advised a sergeant. "You eat it like you're playing a harmonica."

"Thank you very much, sir," said the polite Britisher. "By the way, what is a harmonica?"—The Editor. ☆

☆ MEDAL of HONOR ☆

Sgt. Maynard H. Smith

First Lieut. Jack W. Mathis

"For conspicuous gallantry and intrepidity in action above and beyond the call of duty. The aircraft of which Sergeant Smith was a gunner was subjected to intense enemy anti-aircraft fire and determined fighter airplane attacks while returning from a mission over enemy occupied continental Europe on 1 May 1943. The airplane was hit several times by antiaircraft fire and cannon shells of the fighter airplanes, two of the crew were seriously wounded, the aircraft's oxygen shot out, and several vital control cables severed when intense fires were ignited simultaneously in the radio compartment and waist sections. The situation became so acute that three of the crew bailed out into the comparative safety of the sea. Sergeant Smith, then on his first combat mission, elected to fight the fire by himself; administered first-aid to the wounded tail gunner, manned the waist guns, and fought the intense flames alternately. The escaping oxygen fanned the fire to such intense heat that the ammunition in the radio compartment began to explode, the radio, gun mount, and camera were melted, and the compartment completely gutted. Sergeant Smith threw the exploding ammunition overboard, fought the fire until all the fire fighting aids were exhausted, manned the workable guns until the enemy fighters were driven away, further administered first-aid to his wounded comrade, and then by wrapping himself in protecting cloth, completely extinguished the fire by hand. This soldier's gallantry in action, undaunted bravery, and loyalty to his aircraft and fellow crew members, without regard for his own personal safety, is an inspiration to the armed forces of the United States."

"For conspicuous gallantry and intrepidity above and beyond the call of duty in action with the enemy over Vegesack, Germany on 18 March 1943. Lieutenant Mathis, as leading bombardier of his squadron, flying through intense and accurate antiaircraft fire, was just starting his bomb run, upon which the entire squadron depended for accurate bombing, when he was hit by the enemy antiaircraft fire. His right arm was shattered above the elbow, a large wound was torn in his side and abdomen, and he was knocked from his bomb sight to the rear of the bombardier's compartment. Realizing that the success of the mission depended upon him, Lieutenant Mathis, by sheer determination and will power, though mortally wounded, dragged himself back to his sights, released his bombs, then died at his post of duty. As the result of this action the airplanes of the ——— Bombardment Squadron placed their bombs directly upon the assigned target for a perfect attack against the enemy. Lieutenant Mathis' undaunted bravery has been a great inspiration to the officers and men of his unit."

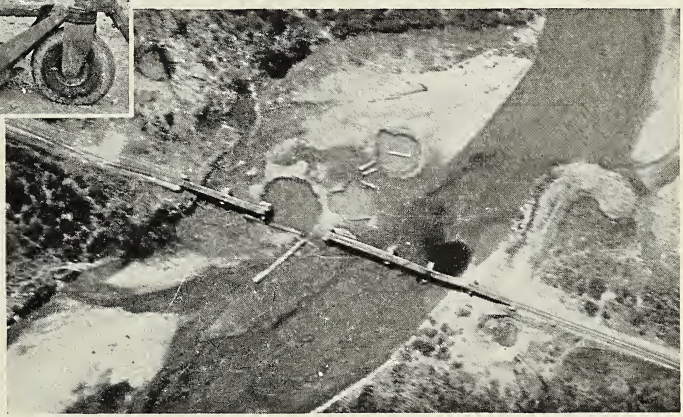
(From General Orders No. 38, War Department)

THE 'B'-40 OVER BURMA

By Capt. Luther Davis

10TH AIR FORCE

A P-40—'B'-40 to this squadron in India—packs a 1,000-pound bomb.



The remains of a railroad bridge at Namkwin in northern Burma after a visit by 'B'-40s.

IN India, where the rainbow and the supply line both come to rather disappointing ends, we've had to do a lot of improvising. Airplane landing-light bulbs serve in movie projectors, salvaged gaskets are items of barter with local tribesmen who use them as anklets—and the P-40, standard American fighter plane in this theatre, has been converted to the "B"-40.

The news is not that peashooters carry bombs—all over the world they do that—but that single-engined fighters have been operated successfully for more than four months as medium bombers specializing in 1,100-pound pay loads in addition to the weight of normal fighter armament. It's not an occasional fair-weather enterprise but part of the established operational routine of the 10th Air Force—and a development that has worried the Japs considerably.

When the first "B"-40 raids occurred, the enemy radio at Rangoon broadcast that we had "a new type of dive bomber," but when the Japs lost ten Zeros in aerial combat with the "bombers" the whole subject was promptly dropped.

Reason for this general disregard of almost all tech orders was the fact that the Japs were supplying forward activities in northern Burma over a single-track railway and a narrow road, both well-sprinkled with bridges. The P-40s, using 300- and 500-pound bombs, blasted away at the targets throughout last February but the Japs were ready with repair gangs and extra rails. Within 48 hours an officially "destroyed" bridge was usually bearing the weight of India-bound Japs, and the bombing had to be done all over again.

In March the enemy was still advancing and it looked as if we would have to divert B-25s from more important tasks farther afield to do the job originally assigned to fighters. Thousand-pound demolition bombs were delivered to the fighter bases and plans made to send some bombardment squadrons there.

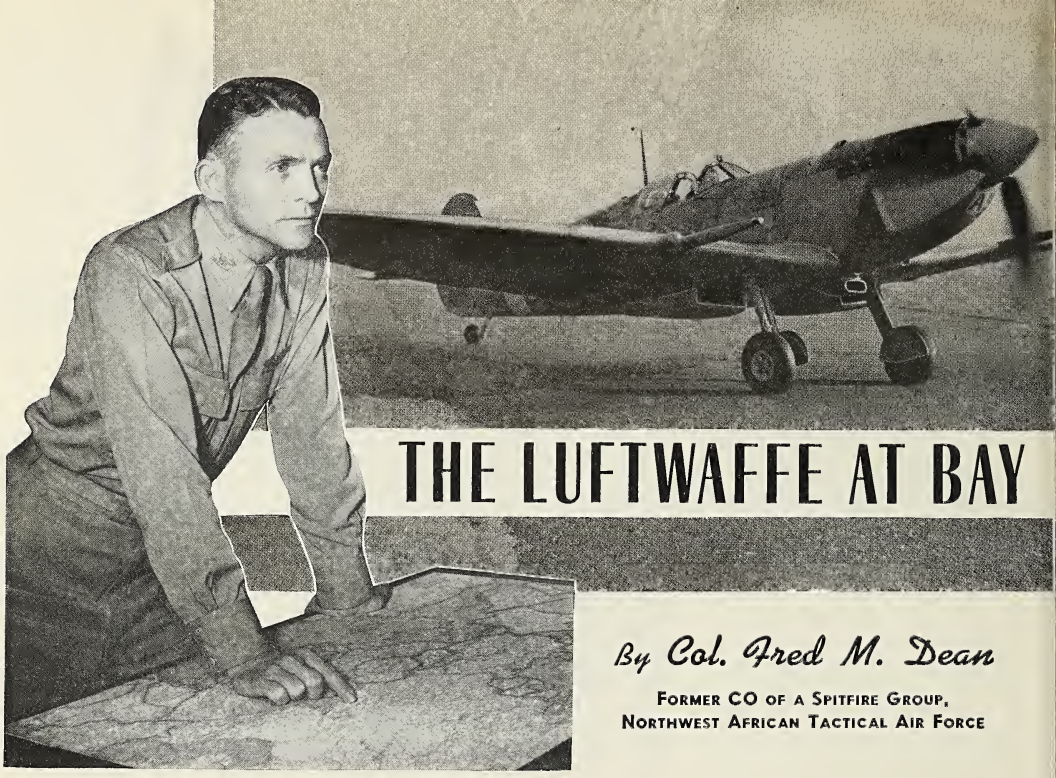
But Col. John E. Barr, executive officer of a P-40 group, took a good look at those 1,000-pounders and then spent an afternoon under his P-40 with his eye on the rivets and his conscience with his God. Next day a short and sober report came into 10th Air Force Headquarters: One P-40 with another P-40 upstairs as top-cover had knocked out the bridge south of Mogaung. "Ordnance expended: 1,000-pound bomb."

PHOTOGRAPHS showed that the trestle hadn't been knocked down or askew; it had simply ceased to exist. On it enemy repair crews spent a great deal more than 48 hours and by the time they had the span "in" again, Colonel Barr had drilled five other pilots in the technique of the 1,000-pounder, and the bridge was thoroughly atomized once more. The answer to our problem has been found in the increased concussion of the heavier weight of explosive. Those B-25s never had to be diverted.

The performance of the "B"-40 is astonishingly close to that of the P-40 with standard armament but no bomb. To reach the Nips these 10th Air Force pilots have to climb over 8,000-foot mountains in a short time. Where such an initial climb is not necessary, the "B"-40 might well become the "A"-40 and operate as a low-level attack aircraft.

The policy of the 10th Air Force is always to give these fighter-bombers plenty of top cover—a luxury, incidentally, which our B-25s and B-24s have yet to enjoy. As a result, it can be reported that four months of operation — just under 100 sorties—have been completed without the loss of a single "B"-40 for any reason. This record has been accomplished despite every conceivable kind of ground fire from small-arms to Bofors—and an occasional rock thrown high.

Someday the people who have nothing to do after a war but figure out what really happened umpty-umph months ago will give thought (Continued on Page 55)



THE LUFTWAFFE AT BAY

By Col. Fred M. Dean

Former CO of a Spitfire Group, Northwest African Tactical Air Force

THE German airman on the losing side of the fence is a despondent, almost panic-stricken fighter in contrast to the Nazi flyer who has things his own way.

Our Spitfire group—one of the two Army Air Forces groups flying British fighter planes—had the opportunity to view him on both sides of the fence. We met him over France last fall. We fought him in his prime over Dieppe. We cracked him when the tables had begun to turn in Tunisia. Then over Pantelleria. Then Sicily.

There was scarcely any contest in the sky over Sicily. The few fighters we met seemed more interested in turning tail and evading combat than in attempting to press interference with our invasion operations. The transports and bombers we encountered likewise were easy pickings.

Not that the turn of events in the Mediterranean and the feeble, futile efforts of the Axis air arm in that theatre should be construed as an indication that the Luftwaffe is all washed up. On the contrary, we have every reason to believe that the enemy has plenty of fight left up his sleeve—plenty of good pilots and plenty of good planes.

The fact that they were not not present in force over Sicily can be attributed to three major factors: (1) the apparent withdrawal of large numbers of aircraft to other fronts, (2) our efficient bombardment of enemy airdromes and supply centers both on the island and on the Italian mainland during the "softening up process" which preceded the invasion, and (3) the swift advance of our ground forces on Sicilian airfields once the invasion was underway.

OUR job with the invasion forces began the day before the initial landings, which took place on July 10. We had been based on Malta for about two weeks and during that period we had flown cover for bombardment aircraft on missions directed against targets on Sicily. When the assault convoys began moving on the island we formed a part of the protective air cover.

None of us shall ever forget the sight of those ships—all sizes ranging from landing craft to the escorting battlewagons. It was by far the largest concentration of surface vessels ever gathered together, and to us flying overhead they appeared as a swarm of water creatures moving against an island that could not possibly be successfully defended.

Enemy air activity was relatively negligible, and in a way we were surprised with the lack of opposition. In anticipation of the heaviest possible resistance from the air, our group had been augmented to a point where we were considerably over-strength. But despite the fact that our casualties were only a fraction of what we had been prepared for, the extra pilots proved to be greatly needed. They enabled us to rotate our flying personnel at a time when we were running far more missions that we ever had before, even those flown on the Dieppe raid.

During those first four days of the Sicilian invasion, our planes were in the air continuously from long before daylight until after dark. All told, we flew more than 400 sorties during that period, with the new men taking their regular turns in the air to provide much-needed relief for group personnel regularly assigned. Our bag for the four days included four bomb-carrying FW-190s, three DO-217s and one JU-88, without any losses on our part.

Seven of the eight planes were destroyed on the second day of the invasion when the enemy threw up the bulk of his air opposition against the assault forces. After this attempt, enemy air activity dwindled perceptibly.

Our ground crewmen, who on the first day or two had awaited our return

There was scarcely any contest in the sky over Sicily for this AAF Spitfire group.

from missions with even more anxiety than usual, soon began to show obvious disappointment when more and more of our Spits returned with the white patches still over their guns. That meant to the men on the ground that our guns had not been fired. When Spitfires are conditioned for a mission white patches are placed over the holes of the recessed machine guns in the wings, and a plastic cover over the cannon. These patches are not removed prior to take-off, so it is easy enough to tell whether any action has taken place when the planes return from a mission by the condition of the white covers. Frequently on clear days, ground crews can determine quite accurately which ships have found good hunting — and which haven't — before their wheels ever touch the runway.

A portion of our ground echelon had moved onto Sicily with the first wave of assault troops, and on the third day of the invasion we were able to fly our group into an airdrome just north of Gela, about ten miles in from the beach.

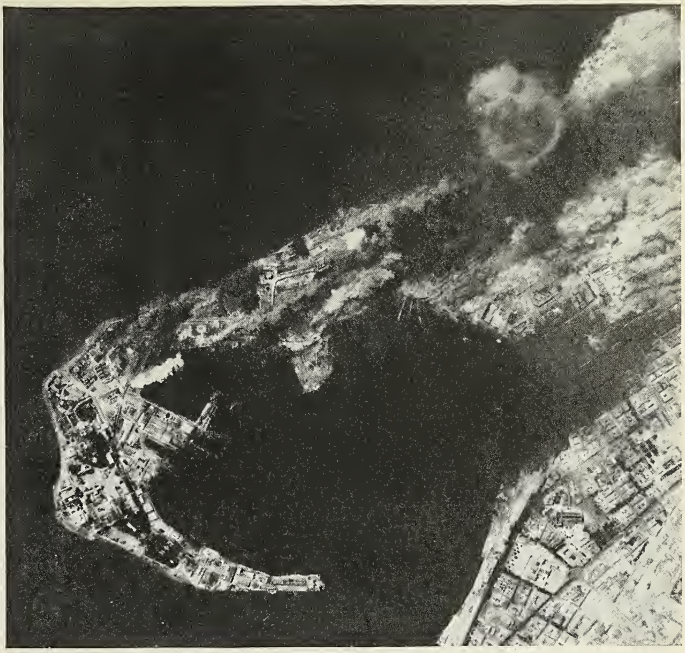
Except for a few bomb craters left by our bombardment aircraft on raids before the invasion, the field was in excellent condition. It wouldn't have been, however, had the retreating enemy forces succeeded in setting off approximately seventy-five 500-pound bombs they had left around the perimeter and under the runway. These bombs were wired together to be set off simultaneously but our ground men cut the connections and succeeded in removing the bombs before any damage was done. Supplies for the airbase also were sent along with the assault convoy, so when we moved our fighters into the field everything was in complete readiness to begin operations.

Ours was the first group to operate from a captured Sicilian base. All facilities at the field had been left intact by the enemy. The airdrome had one of the most complete night lighting systems I have ever seen—better than at many of our airfields in the States. Concrete revetments were scattered about the edges of the base. The few German aircraft left on the field were gassed up and ready to fly.

At an airfield nearby, more than 100 FW-190s and ME-109s were abandoned in operating condition, loaded with gasoline. We made use of the additional fuel but only after it had been thoroughly tested.

On our first night at the new base, enemy artillery shelled us intermittently but no casualties and little damage resulted. A flight of JU-88s raided us on the second night but our operations were not seriously affected.

(Continued on Page 56)



The "softening up process" preparatory to the invasion of Sicily, included the steady, relentless bombardment of key Axis shipping centers and airdromes on both the island and the Italian mainland. In the four weeks ending July 26, AAF planes flew 12,583 sorties and dropped 12,460 tons of bombs on these targets. In the photo above, smoke rises from fires and explosions in Messina's shipping areas. A flight of B-26s (below) passes over Rome on the way to bomb Campino airdrome. Smoke is rising in the upper right corner from the Lorenzo marshalling yards after a B-17 attack.

DREAM CREW

By Capt. Arthur Gordon

8TH AIR FORCE

CAPT. DARRELL L. SIMS and his crew are grounded now. They have flown 25 combat missions in three different theatres of operations under all conditions, bombed their targets, sank subs and shot down enemy planes. Yet, not a single crew member has ever been scratched and not one enemy machine gun bullet or cannon shell has even pierced the metal hide of their B-24. So, of course, nobody has bothered to write a story about them.

But this is the kind of bomber crew AAF generals dream about—the kind that makes Goering tear his hair. A crew that goes out and bombs and comes back—intact.

The trail of this crew leads literally from the halls of Montezuma to the shores of Tripoli with the famous B-24 group, The Traveling Circus. They met their first Germans in June, 1942, in the Gulf of Mexico when they sighted a sub and neatly bracketed same with a pair of depth charges. Four months later they shot down their first enemy fighter high over the locomotive factories at Lille, springing from a base "somewhere in England." In three more months they were in Tunisia, digging dust out of their ears and nostrils, laying 1,000-pound eggs on Rommel's rear guard and dodging flak over Naples. Even today, back in England, the crew's new shoes still crunch Egyptian sand on the floor of the sturdy old B-24.

When their medals finally catch up with them, the crew will muster nine Air Medals with three oak leaf clusters apiece, and nine Distinguished Flying Crosses. But no Purple Hearts.

IF you ask the boys to account for their phenomenal safety record, they grin and refer you to the last three digits of the serial number of their plane: 711. A rather lucky number. A number, incidentally, which explains the otherwise inexplicable name they gave their ship: "Jerk's Natural." The "jerk" in question was the original pilot, Lieut. (now Maj.) John L. Jerstad of Racine, Wis., who at present is a combat wing operations officer. He skippered Jerk's Natural through the first five missions.

Except for Major Jerstad, the tunnel gunner (who was grounded for medical reasons in Africa) and Co-Pilot Robert H. Hudspeth, of Verdi, Nev., missing from a raid in another plane, the original crew has been taken off combat status intact. At the moment all of them are engaged in training new crews. As for going back to operational flying, most of them expect it sooner or later but none is in any particular hurry. After all, they'd been flying and fighting steadily for ten months, ever since that June evening over the Gulf of Mexico when they were on their way back to Fort Myers from a cross-country to Chicago and looked down to see the slim outline of a sub.

"WE had two depth charges that we'd wheedled out of the boys at Barksdale, La.," recalls Captain Sims, a Jonesboro (Ill.) red-head. "We made our run out of the sun, but they must have spotted us because by the time we dropped the ash-cans she was almost submerged. However, our enlisted bombardier, Staff Sgt. Edward W. Eichmann of Milwaukee, did a sweet job—put 'em right alongside. They must have knocked the sub down, because nothing came up but a lot of big bubbles. Next day we heard the Navy went out and found an oil slick covering acres. Never did hear whether we were officially credited with that baby."

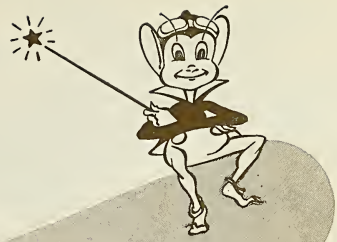
The group finally left Fort Myers, officially credited with one sub definitely destroyed and two probables. In England Jerk's Natural flew in most of the early raids on targets in occupied France. Once or twice she was scratched or dented by flak fragments, but tight formation flying and good shooting kept enemy fighters from putting a single slug into her. Where other B-24s limped home on three engines or fired rockets to warn the waiting ambulance that wounded were aboard, Jerk's Natural went out and bombed and came back and that was that. Her record of the fewest number of turn backs for mechanical reasons of any plane in the group was attributed to the untiring work of her crew chief, Master Sgt. S. M. Benson of Darien, Conn.

Over those concrete sub shelters Capt. Maurice Elstun, bombardier, of Ross, Ohio, began to make himself a reputation. It takes a lot of guts, in case you don't know it, to keep your plane boring into a solid wall of flak, especially after some of the others have tripped their bomb switches and peeled off. Captain Elstun, then a lieutenant, wouldn't release his bombs until he was convinced that he was on the target. And although his deliberate methods gave the rest of the crew a fine case of jitters at first, they eventually came to respect him for it.

Life was rugged enough in England. Once they spent most of the night loading their own bombs and finished just in time for briefing and the take-off. But Africa was tougher still. Dust and sand and a pint of water a day. Cold nights and hot days and long flying distances. That was the toughest part—the distances that had to be flown after combat. It wasn't like England, where you do your fighting and duck for a home base that isn't so far away. The long post-combat grind was hard on men and on engines, but they kept going.

THE first trip over Naples was a breeze, but the second was as rough as anything over the Brest peninsula. The jerries had moved in after the first raid, and the jerries are good. The plane next to Jerk's Natural was shot to ribbons. Looking out of his side window, Waist Gunner Samuel J. Delcambre, a swarthy Cajun from New Iberia, La., could see the crew of the stricken ship collapsing over their guns as the B-24 plunged downward. But still luck—or more probably a happy combination of luck and skill—seemed to be riding with Sims' crew.

Coming back from one raid on Italy they picked up an agitated news broadcast in Italian, and one of the boys knew enough of the lingo to realize that they were listening to a description of their own raid. On another occasion, over Palermo, things were so quiet that they didn't bother to switch off the Jack Benny program to which they were listening, but unloaded their bombs to the unusual accompaniment of Rochester's hoarse chuckle. In two missions, pinch-hitting for the absent tunnel gunner, Intelligence Officer Howard Larry Dickson of Dayton, Ohio, is alleged to have read all of



The story of a B-24 and a crew that flew 25 combat missions in three theatres without a scratch.

Shakespeare's *As You Like It*. Between the acts, he got in plenty of shooting, and although he doesn't claim any fighters as destroyed, he does say he put considerable lead into some of them. Officially, Jerk's Natural was credited with two enemy fighters shot down in Africa.

The radio operator, long tall Tech. Sgt. Robert H. Harms of Alton, Ill. was responsible for saving several lives when a B-24 was shot down five minutes after unloading its bombs over Sousse. He saw six men bail out and float down into the Mediterranean. Instantly he called Malta. Malta was unable to send help, but it did the next best thing. On the International Distress Frequency it called the Germans and told them of the airmen's plight. The Germans obligingly went out and picked up at least two of the survivors.

FLYING over the desert, Jerk's Natural had its only really close call. One of the waist gunners, pouring a stream of lead at an enemy fighter, swung his .50 caliber too far and shot off one of the Liberator's trim tabs. As a result, Sims couldn't hold the ship in formation. She dropped back, along with another crippled B-24. It was just by chance that the fighters chose the other cripple as their victim. They ganged up on it and shot it down while Sims' ship staggered in safely.

The only time the crew ever bothered to put on parachutes was on one occasion when the weather was so bad that the navigator, First Lieut. Rollin C. Reineck of Van Nuys, Calif., had trouble finding his home base. So did all the other planes in the group. In the group commander's plane, preparing for a crash landing, the crew threw everything movable overboard, including a case of practically priceless eggs. (This was a mistake, calling for elaborate apologies and explanations later!) But the Jerk's luck held. At the last minute, almost out of gas, Sims set her down safely.

They all worked hard in the desert under difficult conditions. Tech. Sgt. Phaon T. Wenrich of Pine Grove, Pa., flight engineer and top turret gunner, kept the Liberator's big radial engines turning through 400 hours of grueling flying—200 of them on actual combat missions. For several months, in fact, Jerk's Natural did not see the inside of a hangar—a tribute to the skill of the men who built her.

MORE than once Col. Ted Timberlake took over the plane and crew, "ranking" the pilot out of his seat. This was not hard to do, inasmuch as for 23 missions all four officers remained second lieutenants. To commemorate this melancholy fact Elstun wrote a poem, called "The Gold Bar Boys," which they used to recite sadly to one another over the interphone. Fortunately, the situation has been remedied somewhat since the return to England.

Actually, as is the case in most bombers, rank meant nothing in the air. Staff Sgt. J. R. (Peewee) Lawrence of Colwin, Pa., crouched in his tail gun position, was just as important as the pilot or bombardier. If Waist Gunner Howard G. Crissman of Butler, Pa., failed to keep his gun clean, the result might be disaster for them all. They all knew it and acted accordingly.

When the boys left the States in their nice new B-24 they decided, in a spasm of neatness, to keep it clean and shipshape. To achieve this praiseworthy end, they installed two gallon tin cans, half filled with earth, as receptacles for cigarette butts and other trash. Every time they landed on the northern route to Britain, they emptied the trash and added a little soil to keep the cans half full. They kept doing this in Libya and Egypt, with the result that those cans are now filled with the earth of three continents. Today they are enshrined on a closet shelf somewhere in Britain, waiting for the last lap—the trip back home—whenever the happy day comes.

So that's the story of a bomber crew that never did anything except the job it was supposed to do. No heroics. No superlatives. Just a job. With two tin cans of sand to remember it by. ☆

Capt. Darrell L. Sims, red-haired pilot from Jonesboro, Ill., led the crew of "Jerk's Natural" to a perfect record.

Dear Bud -

Early this summer, William Howard Stovall, Jr., of Stovall, Miss., was accepted for pilot training in the Army Air Forces. His father, Col. William H. Stovall of the 8th Fighter Command, who was credited with destroying eight German planes in the first World War, wrote young Stovall the following letter from England:

8 June 1943

DEAR Bud,

I can't tell you how thrilled I was to get the cablegram from your Mother saying that you had been chosen a pilot. Naturally I hope that you will become a fighter pilot. Of course I know that it depends upon the need of the service at the time whether you are sent to fighters or light or heavy bombers. I know you will do a good job at either.

But if you should happen to become a fighter pilot, it would not hurt for you to begin to train yourself for the job now. I am going to be presumptuous enough to give you some advice drawn from my experience in the last war, from my observations in this one, and from numerous talks and conferences which I have had with the leading fighter pilots of the RAF and of the American Air Forces operating in this theatre.

There are four very definite things that the successful fighter pilot needs which I will set down here in order of their importance:

1. Air alertness.
2. Expertness in gunnery.
3. Efficiency in flying.
4. An aggressive spirit.

I will attempt to explain to you what I mean by the above and also to advise you what you can do in addition to the splendid training that you will be given to develop yourself as master of these arts.

AIR alertness is the ability to see and to know what is going on around you. It is the ability to pick up distant specks on the horizon and identify them as aircraft, either friendly or enemy. The pilot who is able to see his enemy before his enemy sees him gains a tremendous advantage. He is able to begin immediately to employ cloud cover and the sun so that the enemy can be ambushed, and to gain altitude or position of advantage for attack. The battle will be half won if this is attained.

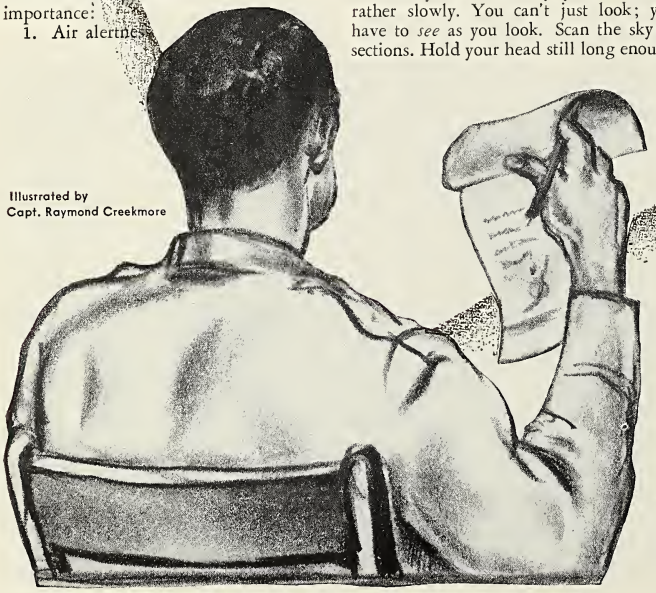
You can train your eyesight to accomplish air alertness. As you sit on the flying line, continually scan the sky. Play games with your associates as to who can see an incoming plane first. It is a matter of eye training, pure and simple. You have shot ducks with me enough to know the importance of eye training. The principle of air alertness really does go into the duck blind.

When you scan the sky, you must do it rather slowly. You can't just look; you have to *see* as you look. Scan the sky in sections. Hold your head still long enough to cover thoroughly that part of the sky within the arc of your vision. When that part of the sky is thoroughly scanned and nothing is found in it, move to another arc and scan it just as closely.

Sometimes air alertness comes too late to our fighter pilots on actual combat operations. Through nervousness they scan the sky too quickly and therefore overlook aircraft that are easily within their line of vision. When you are flying, be continually on the watch for other aircraft in the air. If you have a buddy on the field, let him count the number of aircraft in the air from the ground while you attempt to count them from the air. Do the same for him when he goes up. Through your long period of training, continuous practice like this will help you pick out aircraft instinctively by the time you are ready for operational missions. This training will help you remarkably whether you be bomber or fighter pilot.

YOU may think it strange that I place more importance upon the mastery of your gunnery than upon the mastery of your aircraft but I do so advisedly. Modern fighter planes are so fast that only those pilots who are thoroughly masters of the theory and art of deflection shooting and are thorough masters of the sight are successful. The only excuse for a fighter plane at all is the fact that it is a platform for machine guns to be borne aloft. Therefore, the man who learns to fly an airplane beautifully without knowing how to employ the guns that it carries is more or less like a ground machine gunner who knows how to drive the truck that pulls the gun but does not know how to shoot the gun that the truck pulls.

To aim your machine guns you naturally must aim your plane. Therefore, in your solo flying continually practice aiming your plane at various objects both in the air and on the ground. There must be something along the cowling that you can use as a sight. Learn to fly with the sole purpose of being able to handle a plane to bring it into proper aim. If they have synthetic training devices which teach the theory of deflection shooting, never miss an opportunity to practice on them. I know that the actual gunnery and air-to-ground firing and air-to-air firing that you get will be limited in your training course to a specific number of rounds. However, this does not keep you from doing "dry" shooting as I have suggested You know yourself, when I first taught you to shoot a shot-gun, that the first thing I did was to teach you how to stand and how to bring the gun naturally up to



Illustrated by
Capt. Raymond Creekmore

your shoulder. After you had mastered this dry shooting you began really to hit.

All of the great pilots of the last war—and of this—spent hours fooling with their guns and spent hours on the subject of deflection shooting, range estimation, and the like. You can teach yourself range estimation in the ordinary course of your flying training. So many of our pilots make the mistake of beginning to shoot too quickly and finishing their bursts when they should be beginning them. This is because they have not taught themselves to judge distance and range. If I remember correctly, the last time I took you and Oscar duck shooting you raised hell with me because I told you to get up and you missed and alibied that the ducks were out of range—although I killed two after you had finished shooting! Get your range estimation down to a science. You can do it.

It goes without saying that the better your pilotage the better advantage you can maintain in aerial combat and the more confidence you will have in yourself and your aircraft. If you are able to handle it instinctively, you will be able to concentrate upon your shooting and your deflections. However, the evasive actions taken and the handling of the aircraft in combat are not always altogether in accord with the smooth rhythmic flying that they teach you in acrobatics in flying school. However, it is necessary for you to be proficient in smooth acrobatics in order that you may instinctively recognize and handle your aircraft and understand thoroughly its every reaction to the controls. The purpose of smooth acrobatic flying is to be able to bring you into shooting position. Smooth acrobatics are not good for evasive action. This can be taught later, so do not try it during training unless under specific instructions. I don't know of anything that I can tell you to do over and above what your instructors might tell you to become proficient in flying. The pilots that we are receiving are beautifully trained. Listen and learn is my best advice.

Almost any American boy who is angry enough at the disruption of our happy and peaceful life and who wants to maintain the freedom of the individual for which our grandfathers and great-grandfathers fought will have an aggressive spirit when it comes to fighting the Hun. However, that aggressive spirit can really be capitalized on and made effective by a thorough mastery of the first three categories of the qualifications of a successful fighter pilot: confidence in your air alertness, confidence in your ability to shoot and hit when you shoot, confidence in your flying.

You have always been a good student; you have always done your level best to be proficient in whatever you undertook,

and I might add that by and large you have been tremendously successful and a son to make any parent proud. This is a tough game that you are in. It is a game in which you play for keeps. It is, I hope, the toughest that you will ever have to be put up against. I wish I could see you and talk to you. The chances of my getting back before you finish your training are slim. I can only hope that maybe the god of good fortune will send you this way—not that it is easy here because it is not, but because I would so much like to be in a position to advise you and help you with whatever knowledge I may have.

I trust you are not worried about the slight impediment to your eyesight. I doubt very much if the doctors would have passed you if your eyesight had not been perfectly OK. Just forget about it and go ahead and train yourself to the best of your ability as I have outlined above. Don't forget that I, who possibly know you best, never have and never will doubt your courage, your perseverance, your determination and the high quality of service which I know you are willing and capable of rendering to your country in this time of need. Devotedly,

Dad.

Dear Howard,

I am almost as delighted as your old man at your getting in the Air Force. I feel confident that as a chip off the old block you will do well and make us all proud of you. Your Pa's advice in the above letter is of the best, and I can offer no better.

The best of luck to you and hoping I have you in my command some day.

Frank O'D. Hunter
Brig. Gen., U.S.A.

Dear Bud,

I call you that because your father and I are good friends from the last mix-up, and together in this one, and I've heard so much about you from him that I really feel I'm well acquainted with you.

We were all pleased to hear you are going into the Air Corps, and all want to wish you the best of success. Naturally, we feel this is the one branch of the service to be in, and we also hope you choose the fighter side of the Air Corps, although our Bomber Command is doing great things. I have had the pleasure of making two trips with them into Germany and France, and they are really pouring it on the Hun both in the air and in their bombing. I want to indorse everything your father has said because he has given you the real dope. Speeds are greater and firepower much greater in modern planes, but fundamental principles remain the same. Learn how to shoot upside down and every other way with targets at every angle, and develop your air alertness and you will beat even your father's wonderful record.

We hope to see you over here one of these days before long, regardless of where you go. Carry on with your Dad's spirit, and we will continue to hear great things from you.

All best wishes,
Jack Seerley

Dear Bud,

Listen to all these old men talk! Now here's the "pukka gen" from a newcomer. I've trained and fought over here since the Battle of Britain and if I'd have had advice like this while training I'd probably be a hell of a lot better combat pilot and wouldn't have made as many mistakes. Just lucky the mistakes haven't been too bad so far. Look, boy, you've got a pretty wise dad, but I just want to add that everything, I repeat, everything, he has said if studied and used will be of incalculable value when you meet the enemy. Everything he says in those four paragraphs is what the "aces" have been doing over here since the start. I'm sure you'll profit by what he's said. I hope to meet you soon and have the pleasure of flying with you.

Lots of luck,
Pete

Dear Howard,

I can't possibly be more in agreement with what your father says. As a matter of fact am sending a copy to Elliott Springs' son who is also a cadet now. I have one thing to add and that is I believe you will automatically find yourself doing things that are not in the book. Don't spend too much time in conventional flying unless it is one of the requirements. In this case, of course, you will have to do as directed. Also you should not do it until you are a reasonable master of smooth flying. Best luck,

Larry Callahan

(Continued on next Page)

A Postscript by Colonel Stovall

Dear Bud,

I asked the General to write you a note and comment on my advice. He showed the letter to the others. Who are they? General Hunter—"Monk," as you know him, in his day was a great fighter pilot. Now commands the 8th Fighter Command very ably. Was credited with nine Boche in the last war. Won the DSC with four Oak Leaf Clusters and the Croix de Guerre and Palm.

Callahan (Lieut. Col. Lawrence K. Callahan)—If you have ever read "War Birds" you will know him. If you haven't —read it! He was Billy Bishop's wing man in the last war and helped Bishop run up his score of 76 Boche. Callahan has the British DFC and our Silver Star and two Oak Leaf Clusters.

Seerley (Major)—An old-timer from the 13th Pursuit Squadron. My wing man until he got a flight of his own. Was credited with five Boche.

Pete (Lieut. Col. Chesley G. Peterson)—Is the leading ace of the Eagle Squadrons. Transferred to the U. S. Army Air Forces. He has eight destroyed Boche, five probables and seven damaged. Has been awarded the British DSO, DFC and recommended for our DSC.

Comment from these men is worth a lot. Take it to heart and pass it to your friends if you think worthwhile.

Dad ☆

A B-17 flies about ten miles to the left of a thunderhead formation (cumulonimbus capillatus) over the Northern Solomons in the Southwest Pacific. Clouds like those in the foreground (altocumulus castellatus) mature into thunderheads in about two hours.

BEWARE THE PACIFIC THUNDERHEAD

By LT. COL. JAMES CONNALLY

Tropical storm areas can be penetrated—but you had better know how before trying it.

WHEN you take off for the Pacific or Southwest Pacific, leave behind all your previous ideas about penetrating weather fronts.

All existing plans and procedures are based on the maintenance of a definite course, altitude, speed, and so forth. This, I know from experience, cannot be done in the Pacific thunderstorm areas. For storms in the vicinity of the equator are generally far more violent than those found in the United States. If you attempt to hold a definite course and altitude and fly headlong into some of those severe thunderheads, you will be inviting suicide. On the other hand, a slight deviation may allow you to avoid a thunderhead completely.

The thing always to remember in the Pacific is that no set plan can be established for taking a formation through a front dominated by thunderstorms.

This does not mean you can't get through. Frequently, thunderstorm areas can be penetrated by placing the formation in a column of elements and having an experienced leader pick his way around and between thunderheads. He will select "light" spots in the clouds and occasionally fly on instruments for a minute or two with his wing men in close.

Succeeding elements may lose the lead element for short intervals but you can usually pick it up again when emerging from areas of poor visibility.

This method may be used very effectively at times over water by flying 100 to 200 feet or less above the surface. While areas of heavy rain may be encountered, thunderstorms are generally less violent at this altitude.

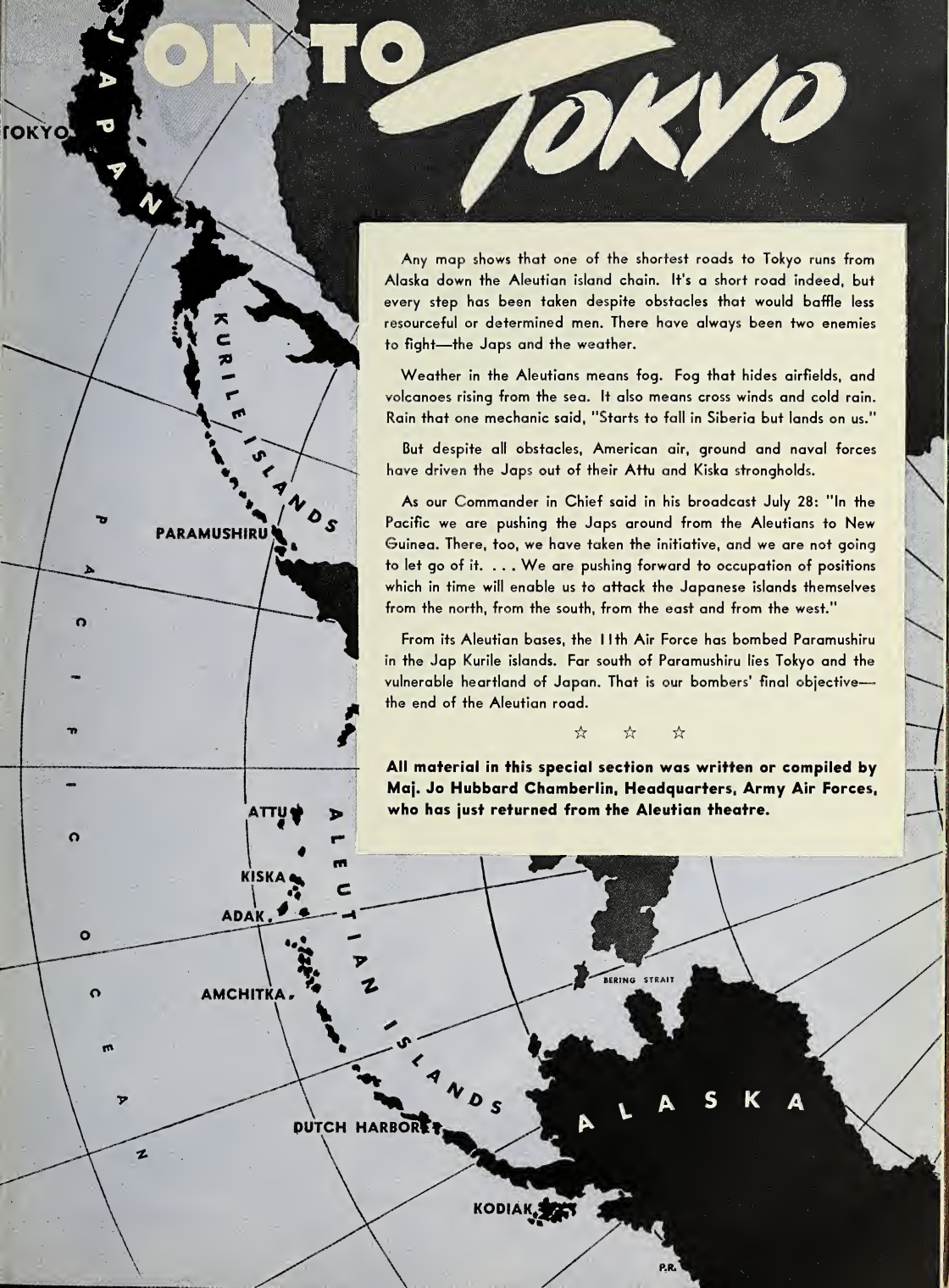
Another technique in flying at a 100-foot altitude over water is to employ a shallow echelon (well forward), with about a two-mile interval between planes. In rain areas individual planes will temporarily lose sight of other planes but can hold their course and possibly remain "contact" by looking out of the side window (on B-17s). Or they may have to pull up to 300 to 500 feet and fly entirely on instruments for short periods.

While the successful penetration of a front dominated by thunderstorms usually will depend more on the leader "picking holes" than upon anything else, sometimes this will be impossible. Then, planes may be able to make it through the front individually and rendezvous at a predetermined point on the other side of the front. In many cases, the formation may have to abandon the flight and return to base.

Above all, never get the idea that any airplane now built can go over the top of all thunderstorms. In some tropical areas, a storm having a top of only 25,000 feet is hardly considered a thunderstorm.

An individual plane can often penetrate these fronts in a similar manner—by flying low over the water and "picking holes." In rain squalls you can usually stay "contact" by looking out the side window. Where visibility gets too bad and you must go on instruments, go up to about 500 feet until you break out.

Of course, the only time a single airplane should be required to fly through such a front is in case of ordinary travel, or when returning from a mission, or when on reconnaissance patrol. En route to a target the formation should be together for mutual protection. It would be unwise to send planes through a thunderhead individually, even though it could be done, unless the target justifies such tactics. ☆



Any map shows that one of the shortest roads to Tokyo runs from Alaska down the Aleutian island chain. It's a short road indeed, but every step has been taken despite obstacles that would baffle less resourceful or determined men. There have always been two enemies to fight—the Japs and the weather.

Weather in the Aleutians means fog. Fog that hides airfields, and volcanoes rising from the sea. It also means cross winds and cold rain. Rain that one mechanic said, "Starts to fall in Siberia but lands on us."

But despite all obstacles, American air, ground and naval forces have driven the Japs out of their Attu and Kiska strongholds.

As our Commander in Chief said in his broadcast July 28: "In the Pacific we are pushing the Japs around from the Aleutians to New Guinea. There, too, we have taken the initiative, and we are not going to let go of it. . . . We are pushing forward to occupation of positions which in time will enable us to attack the Japanese islands themselves from the north, from the south, from the east and from the west."

From its Aleutian bases, the 11th Air Force has bombed Paramushiru in the Jap Kurile islands. Far south of Paramushiru lies Tokyo and the vulnerable heartland of Japan. That is our bombers' final objective—the end of the Aleutian road.

☆ ☆ ☆

All material in this special section was written or compiled by Maj. Jo Hubbard Chamberlin, Headquarters, Army Air Forces, who has just returned from the Aleutian theatre.

LAYING THE GROUNDWORK

Our rapid airbase construction has been a major factor in our Aleutian offensive.

ONE by one, American airbases have been built in the Aleutians despite enormous problems of terrain, weather and supply. These bases have stopped Jap aggression in this area, and they now provide means for our offensive operations.

Nine months ago, Amchitka was a desolate island. Today it is a well-protected, well-equipped airbase, just 85 miles from Kiska and some 750 miles from the northernmost Kurile Islands—the nearest Jap territory. It is one of many stepping stones to Nippon. The difficulties our men overcame to build it are typical of all Aleutian operations. Our troops landed there in a storm on January 13, 1943. Two more storms occurred during the month. Only a reconnaissance party had preceded them to the island. This party had made a quick survey, for time was vital. The Japs had looked the island over, too, preparatory to moving in.

Among the first ashore were aviation engineers, under Col. L. H. Foote. They helped build roads and a dock as well as runways. Col. F. S. Blinn was resident engineer. Col. John Sullivan came later with another battalion of engineers and the combined units started work at once.

Snow fell. The muck was up to your shoetops. Tents were erected and loose boards put down for floors. Candles furnished light. Coal for tent stoves had to be packed by the men on their backs.

All equipment had to be unloaded from ships into barges and the barges unloaded on the beach at high tide. Getting heavy trucks, caterpillar tractors, trailers, scrapers and other machinery ashore through the surf was a real problem. Roads were built over tundra and muck. Land was drained. All roads must have a high crown so that the heavy Aleutian rains drain off. A hard surface of sand, crushed rock or both must be provided to stand heavy traffic.

A frozen lake was located where the fighter strip was to be. The lake was drained but instead of a firm sandy bottom there was silty muck. By exploration a sand deposit was located and the sand dug out, hauled and dumped into the lake bed. To make the runway firmer, it was raised two feet above the original estimate. As much sand was hauled to furnish hardstandings for dispersal areas as was used on the runway.

A mess truck made the rounds of workers in the field with hot food and drink. To keep the trucks and other earth-working machinery rolling, mechanics put "duck boards" down in the mud and lay on their backs to make repairs. The Japs attacked Amchitka and several lives were lost in bombing raids.

Nevertheless, the field was ready, *on schedule.*

DESPITE weeks of gruelling labor, the engineers stayed up all night to cheer the first fighter planes in, on February 16.

Two days later, the Japs sent two float Zeros over from Kiska on reconnaissance. American fighters, waiting high in the sky, shot them both down. The engineers' labor had paid quick dividends.

Meanwhile, work had been proceeding on a bomber runway. At the earliest possible date, the heavy bombers wanted to blast the Japs on Kiska from this base less than 100 miles from the enemy-held island. So 24 hours a day the work went on, with the big machines carrying sand from the pits to the runway site. It, too, had lakes to be filled in.

Other preparations had to be made before planes could fly. The ground echelon of a heavy bomber outfit came to Amchitka on April 20. Its job was to erect tents, construct a mess hall, establish communications and get gasoline, oil and bombs ready for use. The men wore high boots. The airbase commander, Col. A. E. Hebert, was among those who went up in muck to his hips. Most of the difficulties were due to the tundra—a soft spongy layer of earth and moss, from three to twelve feet in thickness, which soaks up water in summer, often freezes solid in winter and is very unstable.

A young second lieutenant, Virgil Watson, of Cincinnati, Ohio, found himself responsible for this particular work al-

MOSQUITOS ALASKAN STYLE

The flight characteristics of Alaskan mosquitos have been greatly exaggerated. It is not true that they peel off, dive on you and flip your dog tags over to ascertain your blood type before striking. There has been only one proved instance of this. They are not as large as vultures. They are only as big as an Arkansas hen—very small but very tough. The Department of Agriculture crossbred the Alaskan mosquito with a small-bone turkey, to reduce their belligerence and provide an edible fowl, but the mosquito strain was dominant and the experiment was abandoned.

It does no good to use screens on barracks because one small, wiry mosquito is pushed through the mesh by the bunch, and then he pulls the others through. It is not true that anti-aircraft outfits fresh from the States have opened fire on them, thinking they were Zeros. Their tail assemblage is entirely different.

though he was a communications officer. He was 25 years old and had been in the Army just six months. Handling engineering matters later on was Lieut. Jerome C. Goodman. Lieutenant Watson brought twelve men to begin the job. His first task was to prepare tents and living quarters for sixty additional men who were on the way in a ship with 600 tons of supplies. Later thirty more men arrived, so the radio officer found himself a construction boss with 100 men.

A road leading to the bomber strip went but a short distance uphill. From then on men had to transport their supplies over tundra, bogs, lakes and muck. As the caterpillar tractors available were being used on the runway in the daytime, the ground echelon had to borrow them for use at night to haul their supplies from the beach to the area that had been set aside for the bomber command.

The going was so rough that a caterpillar tractor was used to pull a trailer, which also had caterpillar treads. This team was followed by another tractor which would pull them out when stuck. Sometimes all three vehicles would get stuck — even though a soldier plodded ahead of them to pick out the best way. So Lieutenant Watson had some sledges made which didn't bog down in muck when the cats did.

Rain fell. The men were soaked. An Army physician said that he treated enough first aid cases among the 100 men for a whole regiment—bruises, cuts and pulled tendons from slogging through mud. Weights up to 2,000 pounds were carried on the shoulders of as many men as were able to get round the box and lift it.

In a brief ten days the ground echelon had scraped out locations for tents for officers and men, going down through the tundra to hard rock. The men erected mess halls and pyramid tents and built tables to eat on. They put up quarters for officers and men, drew coal, lugged it on their backs and had it all ready for use. They hauled bombs, gasoline and oil where they would be available for an immediate combat mission. The air and ground crews, had only to move in and go to work.

And here's the payoff:

On May 3 the B-24s came to Amchitka at 1000 o'clock. Crew members put their baggage down on the hardstandings near the runway and ate a hot meal that was ready for them. Their planes were serviced and they took off on a successful bombing mission against the Japs *the same afternoon.* ☆

ON TO TOKYO

'Enough to Make a Demon Cry'

In the Aleutians, American forces built many airbases while the Japs struggled to build two—one on Kiska and one on Attu. On Attu the Japs had been trying to complete a fighter strip for four months. Eight days after American troops had landed, we had a fighter strip in operation.

The Japs not only lacked American engineering experience and skill, but our fighters and bombers subjected the Japs and their machinery to cantinual strafing and bombing. That such attacks were successful is evidenced by notations in the diaries of dead Japs on Attu:

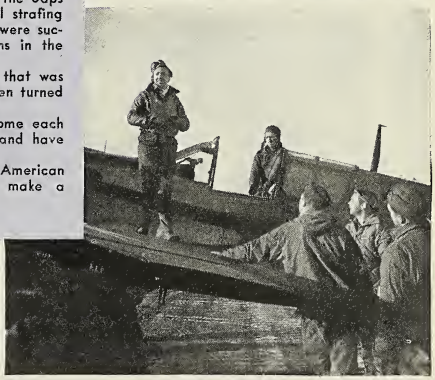
"When one looks at a place that was bombed, it looks as if it had been turned inside out."

"Because the enemy planes come each day, the soldiers are tired out and have no energy."

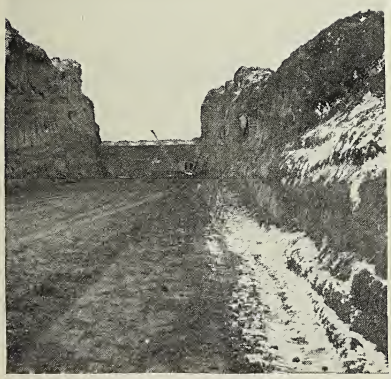
"These strafing attacks by American fighter planes are enaugh to make a demon cry."

A runway crosses a large creek. The heavy rains on Amchitka require large-capacity drainage facilities.

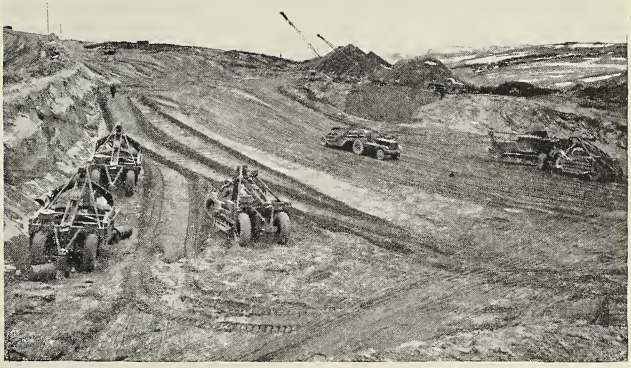
The pay-off: The first fighter plane lands on the runway at Amchitka. Next day, two surprised Japs were shot down.



Below is shown just one section of the huge sand pits which were dug to get sand for fighter and bomber strips.



Sand is hauled by truck from big pits to build foundations for the runways and dispersal areas.



ON TO Tokyo

HOLD YOUR HATS

A B-25 mission runs into some close calls in blowing up a Jap fuel dump on Kiska

THIS medium bombardment mission was planned by the men who took part in it on March 30, 1943. While the pilots had been flying in the Aleutians for some time, most of the co-pilots and bombardiers were on their first mission. They were due for some surprises.

Six B-25s hoped to catch Kiska unawares. The planes skirted sixty miles to the west of the island and then came in, facing a mountain. They split up in three elements of two planes each.

"A" element flew to the left of the 1,300-foot mountain. Elements "B" and "C" flew to the right of it. "C" flew up a ravine.

"A" element consisted of planes piloted by Lieut. William B. Jackson of Carbon, Texas, and Lieut. William E. Geyser of Anchorage, Alaska. They attacked a radio station and fighter strip. "B" element, headed by Lieut. George A. Barber of Lubbock, Texas, and Lieut. William Candy of Braintree, Mass., attacked the main camp. "C" element's planes were piloted by Lieut. Ray Stolzmann of Marshfield, Wis., and Lieut. Everett Henricksen of Chicago.

STOLTZMANN has been in the Army eight years, rising from an enlisted infantryman to flying officer. He is quiet-spoken, with courage to spare. Henricksen is light-haired and stocky. He used to fly as a hobby before joining the Army. He was an accountant for a real estate firm.

Stoltzmann was leading "C" element and right behind him was Henricksen's plane. They roared up the ravine to the right of the mountain and dove down the other side of the "saddle," as the central, narrow part of Kiska is called. The Japs were firing their anti-aircraft and machine guns. Stolzmann dropped his bombs, which had delayed fuzes, but unfortunately the bombs went off instantaneously. They blew up a Jap oil storage installation—but they also gave Henricksen, 300 feet behind Stoltzmann, the benefit of their full blast.

A bomb fragment smashed the glass in front of Henricksen and cut his arm. His B-25's wing was blown out of line, and riddled with holes, but he skillfully kept the plane under control. At the time of the blast, Henricksen's bomb bay had been open and the bombardier had been about to release his bombs. The blast jammed them. One 500-pounder was caught vertically, making it impossible to close the bomb bay doors and placing the crew in a potential position of being blown to bits should the bomb be struck a sharp blow.

LIEUT. ARTHUR HORN, the bombardier, squirmed down into the bomb bay, after slipping off his parachute due to the narrow space. He first removed the fuze. There is no catwalk in the B-25; he had to hang on with his fingers and wrestle with the bomb for fifteen minutes before he could get it free. Then down it fell. He then worked two 300-pound bombs back on their racks and climbed back to safety.

Five of the six planes met at the rendezvous, and four of them were damaged. Geyser in the sixth plane was having *his* troubles. His controls for throttle, propeller pitch and mix had been shot away. But the engine, in such a situation, assumes a fast cruising speed. So Geyser flew his B-25 back to base, and although he could not get his damaged wheels down, he made a successful belly landing.

From information gained later, we learned that the Japs lost a great amount of oil on this raid, so the troubles endured were more than worthwhile. The War Department thought so, too, and awarded DFCs and Air Medals. ☆

KISKA MISSION

By Capt. James C. Beardsley, Navigator

We headed westward with a cargo of death
We flew far West on the wind's wet breath.
A thousand miles of engine roar
Ere, shadowlike, we saw the shore—
A baseboard to a wall of mist.

The flash of cannon was our welcoming sign;
The sound of their shells, and the bullets' whine;
Presenting a glimpse of man-made hell,
Of death amid the battle yell—
A holocaust of fire and flames.

Our vengeful fingers stoked smoking guns.
Down dropped our bombs in whistling tons,
Missiles of death, of fire and hate,
Destruction most articulate.
We burned and maimed and slew.

Up into a cloud we climbed for cover.
Our bomb-load gone, we must get another.
Already, while we plan *tomorrow's* raid,
The isles behind us fade
To turgid mist and sea-stained stone.

THERE'S NO LAND LIKE IT

IN Alaska you can stand in the mud, have dust blow in your eyes, be within six feet of a snowbank and yet perspire like the devil. There's no land like it on the globe.

SPORTSMAN'S HEAVEN. The military garrisons in the interior of Alaska are isolated, and manufacture their own entertainment. They enjoy hunting and fishing. One airbase I visited served up barbecued bear meat. It was delicious. Another outfit caught 600 pounds of trout in one afternoon. Fish bite in Alaskan streams as they never do at home, and the woods are full of game.

At another airbase, pilots fresh from the States are often told by the control tower that they will have to circle around for ten minutes before landing to allow time for a soldier to hop in a jeep and shoo bears off the runways.

MAIL. Men in the Aleutians receive strange gifts through the mail. As any soldier knows, spam or luncheon meat appears on mess tables with disturbing frequency, and yet one officer received a can of it from his wife—as a birthday gift. Another man got a can of tuna fish, also on the menu far too frequently. A tough crew chief received, for no ascertainable reason, an application blank to join the WACS.

One day an intelligence officer, Capt. Phil Orcutt, was sitting in his quonset hut, going through his mail, while outside the rain fell and the wind blew. He opened a form letter from a well-known national magazine, which began as follows: "As this letter reaches you, you are, no doubt, sitting on the porch of your summer cottage, or perhaps you are seated on the deck of your yacht, thinking about the fine job our boys are doing overseas. . . ."

TALE. There are no cows in most parts of Alaska. A woman was going to have a baby, so a cow was actually flown in by transport plane. Unfortunately the cow went dry. So a friend hundreds of miles away flew up a bull to mend matters. Meantime, however, the cow had been flown south with the same objective in mind. So, there they were, 1,000 miles apart, and that's where they stayed.

COOPERATION. One does not have to be in the Aleutians long to see that Army and Navy cooperation is of a high degree. To mention a few examples:

1. Both services exchange motion picture films.
2. Navy ships stores and Army Post Exchanges sell to all service men.
3. On many missions both Army and Navy planes participate. The Navy sends out a PBY rescue plane which has saved many AAF lives.
4. Navy PBYs patrol the ocean and report results of AAF attacks, mainly on Jap shipping.
5. The exchange of intelligence and other vital information.
6. Some items of Navy clothing that are especially good for this theatre are purchased by Army men, and vice versa.
7. Active social relationships are maintained between Army and Navy personnel. Motion pictures, candy, tobacco and poker are enjoyed equally by both branches. At last report, the Army was ahead in poker winnings—but by the scantiest of margins.

HOW TO SLEEP. Men sleep on the cowl of a jeep, on the seat of a bulldozer, leaning against a tree, or lying on the ground, but in a transport plane it's tough. I noticed that one old hand opened up the lid of a tool chest and slept soundly on the hardware stowed in it, with his feet dangling over the end.

Transport planes have side seats consisting of a series of aluminum pans, designed to hold the seat cushions of chutes. Sleeping on these seats is like sleeping in seven buckets, but it can be done. The best plan is to lie on the floor with a flight bag for a pillow. It sleeps fine if you are tired enough.

RUGGED LIFE. It is difficult to realize, viewing some of the Aleutian bases today, that they were built and used in earlier months, under the most rigorous of conditions. Men lived in tents with no floors. There were no lights and C-rations were used for months. At one island base the coal was limited to five pounds per man until a shortage was made up. The men just crawled into their sleeping bags after work in order to keep warm.

HORRORS OF WAR. Getting on our plane at an airbase near the Arctic circle was a sun-tanned young civilian, dressed in cotton slacks, cotton shirt, light polo coat and low tan shoes. He had been grounded at this chilly base for a week. A resident of Arizona, he had been ordered to report for civilian war work in Alaska immediately, so he had come ahead —without the opportunity of drawing arctic clothes. He hoped, he said shiveringly, to draw woolens soon.

MAN'S LAND. A USO show came to town with some girls in it. One of the pilots, a Lieutenant Mullins, knew one of the girls and, through this contact, invited them over to the hut after the show. The boys cleaned the hut up for the first time in months; they were shaved and slicked up—only to have the girls telephone at the last minute and say the General had asked them over so they couldn't come.

Lieutenant Mullins later had two dates with his friend in the show, to the envy of the other pilots. The Flight Surgeon moaned, "Twenty-thousand men on this island and she asks for Mullins." However, Mullins let the FS eat supper with them—and then shooed him away.

When this particular outfit first came into the area, the men brought in crates of fresh eggs, hams and fruit. One chap who brought in two bottles of Coca Cola sold one for $30 and was about to sell the other one, when he decided that if it was worth that much, he would drink it himself—and did. It isn't that scarce now, but it's still not common.

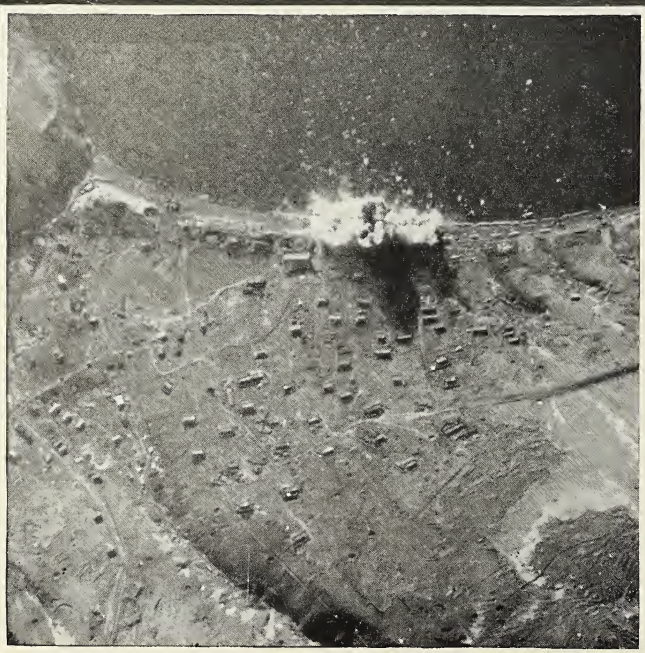
CONTEST. I played center field in a softball game. Our team lost, 32 to 4. It took me a little while to get used to the Aleutian style of play. Nobody except myself paid any attention to the rain, to the 30-mile-an-hour breeze which blew fly balls in two directions, or to the Simmons-soft tundra which gave the ball a terrific bounce. Till I got the hang of it, I almost went crazy—and so did the team.

PLUMBING. In one quonset hut, the boys had fixed up a drum of cold water on a platform, which fed into a tank on the stove, thence to a sink, and from there out a drain—all made from hydraulic lines out of junked airplanes.

WILD BLUE YONDER. I have had some strange experiences but I never expected to buzz moose in a nine-man glider. We took off, towed by a C-47 at 160 mph, and went hedge-hopping across the tundra and flats, just clearing the tree tops. We skimmed the hills and swooped down into the valleys, looking for moose. We spotted a herd of deer. Then, not far from the foot of a glacier, we saw a moose splashing out of the water, frightened by the plane. We had to turn around in a high, narrow valley near the Manatuska, and for a moment I thought we would have to release our glider and land in the timber. However, the pilot sweated out the sharp 180-degree turn, and we headed back to the field.

SQUIB. There are no trees in the far Aleutians. Not long ago there was a story in American newspapers that the pilots at Umnak had flown in a single tree, planted it and labeled it "Umnak National Forest." The news item neglected to mention *why* the tree had been flown in—for the exclusive use of a flyer's pet dog.

ON TO TOKYO



Precision bombing pays dividends in the Aleutians. The Japs built huge revetments, but it was no use. Photo above shows a submarine base on Kiska harbor that AAF bombs have blown apart. One damaged midget sub is still on the ways. The wavy black lines along the beach are trenches.

☆ ☆ ☆

At left, a bombardier drops his eggs just where he wants them—on docks and float Zeros. All Zeros were later destroyed.

☆ ☆ ☆

At right, an oblique view of Kiska harbor on an unusually clear day. Salmon lagoon is in the central foreground. Heavily defended North Head lies between Salmon lagoon and Kiska harbor. Jap fighter strip is beyond the lagoon. Two beached ships that AAF planes have destroyed can be seen; more lie beneath the waves.

SURPRISE RAID ON KISKA

By CAPT. IRVING L. WADDLINGTON

It was pitch black, as I felt my way around the tent in search of my pants. I was eager to get outside to see how the weather was going to be. We had landed at Adak just a few hours before, and now we were making our first raid. Outside, I gazed at the sky and no stars were to be seen. The wind was cold. A faint light showed that there were clouds hanging in the harbor. Was this good or bad? I couldn't decide for sleep was still full in my eyes. I would rather have Japs shoot at us than to climb through an overcast with forty other planes.

After bolting a few flapjacks, we hurried to the plane and awaited take-off orders. At 0700 our engines were running and by 0800 we were all in the air, starting for Kiska. There were P-39s on our port side and P-38s on our starboard, with B-24s in between.

The ceiling was 1,000 feet with occasional skud down to the water. This we skirted to keep the peashooters in contact with us.

As we rounded Segula Island we stayed low to the water. Col. W. O. Eareckson with his two wingmen were in front. Major Watt and his flight were slightly higher and to the left. Major Watson was higher and to the right, followed by Captain Smith and his flight, which was low and behind Major Watt. About fifteen miles out the signal came for more power, and each of us jumped as if he had been shot. The pursuits dropped their belly tanks and surged forward just above the water. About four miles from the target we were flying with our throttles nearly wide open.

Softening up for capture means many a heavy bomber pounding such as this.

We were about four miles from Kiska's North Head when I saw firing off that point. There were two large guns and they were following us up nicely. One shell hit directly below our ship, throwing a huge geyser of water that nearly touched our belly. The burst destroyed two of our radio antennae. Little Kiska opened up but I couldn't see what firepower was there since we passed to the right of the Head. The leading P-39 dived on one large gun emplacement, silencing it with a single burst.

Our top gun turret opened up with a terrific noise. It seemed to me as though it was firing right between the pilot's seat and my own. The cross fire from Little Kiska, North Head, and South Head seemed impenetrable, and ships anchored in the harbor were throwing a large amount of fire.

Just before we reached the Head, a Jap machine gun sprayed the water in front of us. Lieutenant Lockhart opened up with his front side gun, and the firing quit before we came to it. Lieutenant Lockhart was not sure that he hit the emplacement but was sure that he had scattered the personnel.

Colonel Eareckson was a hundred yards ahead of us as we came into the mouth of the harbor. Because of the angle of our approach, we had to make a dangerously steep formation turn close to the north cliff to stay on the right side of the harbor and hit our objective. The bay is small and by the time we had rolled out of our turn, we were almost to the camp area—our target.

The large transport in the middle of the bay was my greatest worry, since we flew directly over it. On the bow there was a large gun, with several machine guns on the decks. Every one of our gunners who could see the ship strafed it from one end to the other. Our port side gunner gave it a burst, and the tail-gunner said he raked it from stem to stern twice and almost blew the bridge apart with a long burst.

At this point the fire from the right side of the harbor seemed to diminish. I think we were so low that it was hard for the Japs to bring their guns to bear on us. We received a hit in the starboard wing, next to the number four engine, that entered from the top. Either we received this while in our steep turn or from somewhere along the top of North Head. We also received hits from below, behind and to the left. One went through the glass door, barely missing the side gunner, and another penetrated the right rudder.

A float Zero took off the water on the course we were making. He pulled up immediately in the most "straight-up" climb that I have ever seen. Two or three top gun turrets turned on him; then two P-38s blew him apart.

The camp area was directly ahead of us. The tents were very close to one another, in line with buildings in the rear and about 200 yards from the beach. A small dock and several shacks were located on the beach. Bombardier Lamberth's first bomb hit next to the dock, going through a row boat that was tied to it, and the rest of his bombs were evenly distributed over the area.

The Japs' Best Friend

In the Aleutians, the weather has been the enemy's strongest ally. Fog which lasts for days made it impossible for us to gain the cumulative results of day-after-day bombing, and it permitted the Japs to rebuild.

On Kiska the enemy constructed huge earth revetments around each building and installation, so that bombs had to be dropped with pin-point accuracy, despite heavy anti-aircraft fire and poor visibility.

But month in and month out, whenever planes could fly, our men took off in fighters and bombers to attack the enemy. This narrative by Captain Waddlington describes a typical heavy bomber mission of the kind that struck the Japs down . . . and out.

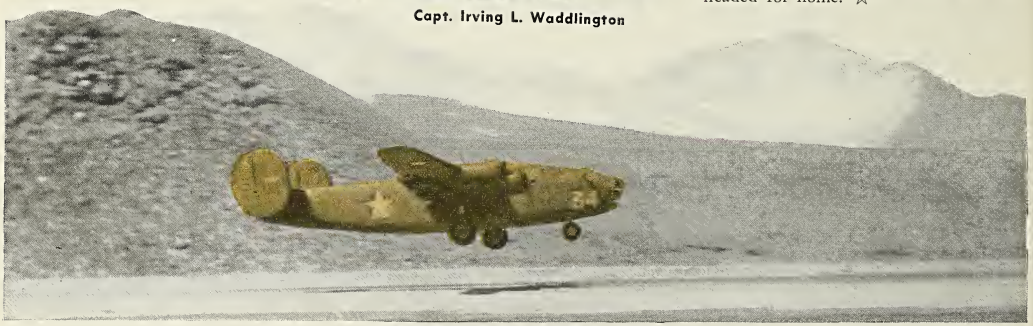
Our engineer Technical Sergeant Sahroian was operating the bomb bay doors, so he had a bird's-eye view. One demolition bomb hit and took a whole row of tents with it as it bounced along the hard earth. An incendiary struck a building that resembled a mess hall and immediately covered the roof with fire.

We climbed gradually up the slight rise ahead of us so we could cut through a small valley and out the other side. As we climbed we must have been the only bomber in sight of the south side for Jap tracers were following us. We saw machine gun emplacements on our left. We could see men scurrying up zig-zig paths to the guns as we neared them but they fell flat when they saw us heading toward them.

Capt. Irving L. Waddlington

There were several P-38s circling over the water as we came out the other side of Kiska Island. After we had turned right and started around the north tip of the island, anti-aircraft guns opened up so we veered to the left and out of range. They, however, were shooting at the P-38s, not us. We then saw a B-17 picking up our fighter planes and we circled, waiting for the rest of our flight to rendezvous. One of our gunners saw two of our pursuits on the tail of a Zero collide and fall into the water.

I checked our crew to see if each man was all right and to determine the extent of our damage. We checked in by radio with our flight and they all answered. Large columns of smoke were rising from the harbor as we turned our backs and headed for home. ☆



A B-24 takes off to bomb the Japs.

MAN AGAINST NATURE

Not only have the American soldiers been affected by life in the Aleutians, but life in the Aleutians has been greatly affected by American soldiers. Take, for instance, the raven of the western Aleutians, *kiwi arcturus*. These islands have been his habitat for centuries. Larger than the ravens commonly seen in the United States, he is a rugged bird, hardened to life on the chill, tree-less slopes, and accustomed by hard experience to scratching out a living. A few ice worms and glacier snakes—when he can get them—constitute his diet. He is, understandably enough, not of a happy-go-lucky temperament but he is alert, imitative and quick to make up in intelligence what he lacks in charm.

But since the Americans have come to the Aleutians, there has been a complete breakdown in the raven's life cycle.

First indication of this came in the fall of 1942 when a fighter pilot observed a string of ravens flying alongside his ship, and they were doing, whenever he did, slow rolls and snap rolls. The ravens were awkward at first, but soon they were executing these maneuvers with such precision and fluidity that the pilot decided he'd show these birds something. He turned the show into a rat-race, hedge-hopping and buzzing the field, but to the pilot's chagrin, the ravens not only could do the job better, but one raven flew alongside carrying a small piece of a sergeant's ear that he had nipped out while this GI had been standing agape on the field watching the show. The disgusted pilot gave up and landed his ship.

To his amazement, all ravens followed him in, peeling off and setting themselves down like hot pilots, without even bothering to let down their flaps, and stalked off to their own "line" along a lagoon. An intelligence officer, who happened to be hidden while fishing behind a sandbank, was able to verify the recent report that these ravens were now talking among themselves with a Texas drawl. They had been jamming the radios of a Texas bombing outfit, which had reported in to the base four weeks before, and picked up the lingo.

An anti-aircraft gunner recently pleaded in vain for permission to put a burst or two in a particular flight of the birds.

He pointed to a triple, twelve-bird formation, winging steadily along in best B-24 style on a course of 270 degrees true, "The othuhs is tryin' to be fightuh pilots, but them so-and-sos ovah theah, ha' been bombin' us all mornin'."

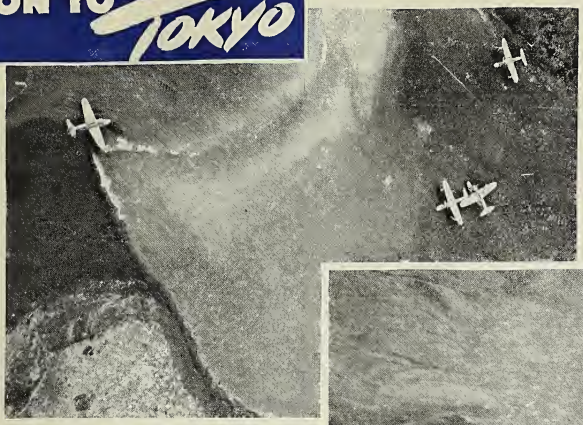
The effect of military tactics on the ravens is not as great as the adverse effect on raven home life. Whereas they used to forage for their own food, they now hover lazily over the cook houses, waiting for a KP to come out with a load of slop, and then they follow him to the garbage burial hole.

Older parent ravens are unable to persuade their young ones that someday the Americans will be gone, this picnic will be over, and they will have forgotten how to earn a living on these chill shores. But the young ravens dismiss such talk as old fogeyism. Too lazy and fat to fly, with full stomachs they now *walk* behind the KPs to the garbage dumps and search for fermented foods and fruit juices hoping to get drunk. One Saturday night the heart of every man in camp was touched at the sight of one old father raven, out looking for his wife and sons who were "on the town." He found them deep in their cups and had to take them home and put them to bed—dead drunk.

"It sho' does come hahd," he said to himself, and then cursed softly, realizing that he too was speaking Texan and not the pure Aleut his raven ancestors had used since the last ice age. ☆

ON TO TOKYO

THE FIGHTERS POUR IT ON



Before: **An American patrol plane spots float Zeros on the beach at Attu, tossed about by a storm.**

After: **American fighter planes strafe the Zeros, destroy every one.**

"ENEMY planes flew over today. Their object was to play havoc with our strong reconnaissance and with our spirits."

"Most fighter planes executed dive-bombing with lightly loaded bombs, and we had comparatively great losses."

"At first the enemy used time fuzes which exploded in three minutes, but later the enemy used fuzes which exploded one to two hours after dropping. They gave us spiritual fear and labor delays."

"Twenty casualties occurred this week among the —AA Battery as a result of strafing fighters. The appearance of being shot by machine guns repeatedly, by seven or eight planes, is very mortifying; we just grit our teeth because we cannot do anything about it."

Thus have the Japs themselves recorded the effectiveness of American fighter operations in the Aleutians, and both airmen and ground crews share the credit.

Our fighters have protected our bombers in their attacks on Kiska and Attu, and proved the value of combined operations. They have shot Zeros out of the sky. They have flown reconnaissance and patrol. They have strafed and dropped bombs themselves. When our bombers were roaring over Kiska, our fighter planes preceded the B-25s and B-24s, machine-gunning anti-aircraft installations and helping thereby to save lives by diminishing AA fire. Kiska had seventeen separate gun batteries. Without the fighters to precede them, many bombers would doubtless have been lost.

Our fast P-38s have been especially successful in such operations. In the early days of the Aleutian campaign, our bombers had to fly long distances to attack the Japs—beyond fighter range. But as soon as we had bases in the Andreanofs, less than 100 miles from Kiska, our fighters really did their offensive stuff. P-40s and the P-38s would dive right down the AA gun barrels. They silenced the gun crews or drove them into their foxholes. And from their nearby bases, the fighter planes could fly many more missions per day. While weather in this area would not permit flying every day, repeated missions on the same day gave the Japs no letup.

It's no easy trick to land a high-performance plane on an Aleutian strip in a stiff cross wind. Runways in the Aleutians are often built on the only flat land available, which means: Look out for nearby hills or peaks. The fighter pilots had more, perhaps, to fear from fog closing in on their airfields while they were out on a mission, than the bomber pilots, who had larger gasoline loads. As rapidly as possible, airfields and auxiliary bases have been built, so that if one island is closed in the planes can reach another. But fighter pilots still have their problems.

Not long ago a P-38 mission took off to strafe Kiska. Fog blanketed their home base. Several men flew to another base and managed to land through a "hole" in the soup. One pilot, with his gas running out, elected to land on the water, but he was seriously injured while doing it and was drowned. Another P-38 pilot landed in the water of a lake on a nearby island which was clear of fog. He climbed out of his peashooter before it sank, swam 150 yards to some rocks and waited there for rescue. A Navy PBY had to land on the sea, three miles from the lake. The PBY crew carried a rubber life raft to the lake, launched it and rescued the pilot.

The line crews have done a splendid job in keeping a high percentage of planes in the air. Maj. Gen. W. O. Butler, commanding general of the 11th Air Force, has paid them high tribute. Early in the Aleutian campaign, there were no hangars to protect ground crews from the elements. There are not many today. Most of the repairs are made in the open. When a "push" is on, the line crews work hour after hour without letup. One day thirteen fighter missions went out, in addition to reconnaissance and patrol planes.

During the past winter a storm came up, with snow-laden gusts running up to 100 miles an hour. Six hours later, Colonel DeFord of the Bomber Command went down to the dispersal area to see what planes had been damaged in the storm. To his pleasure, he found not only that no ships were damaged by the storm due to careful preparation and anchoring. but the line crews also had two full squadrons of planes *ready* to blast the Japs.

The line crews know that their fighters are doing a large part of the job of killing Jap soldiers, destroying their weapons, destroying their ability and will to make war. Fighter pilots in the Aleutians have proved that they could pour on the Japs more than the Japs could take, week after week, month after month—paving the way for the enemy's annihilation. ☆

THIS IS YOUR ENEMY

. . . IT'S YOUR LIFE OR HIS!

AIR-TO-AIR bombing has been employed for more than a year against our bombardment aircraft, chiefly in an effort to split up tight formations.

The enemy has directed bombs at our planes over the South Pacific, the Aleutians, western Europe, the Mediterranean and southern Europe.

Most of the bombing has been done by enemy fighters flying from 1,000 to 3,000 feet above and in line with our formations. Although individual attacks have been most common, simultaneous aerial bombing by Jap fighters flying in V formation has been reported. Dive bombing has been attempted by both Japs and Germans, with bombs being released from 150 to 500 feet above our formations.

Enemy fighters have been known to fly at the same altitude and speed, and on the same course of a formation but out of gun range, obviously giving data to fighters overhead prior to the release of bombs from the latter. Air-to-air bombing often is followed by conventional attacks with guns and cannon.

The bombs believed used in this manner have varied from 20-pound fragmentation to 500-pounders. Our crews have reported the bomb bursts to be of various colors—red, black, blue and white; others have been characterized by purplish smoke and white streamers; still other bursts have cascaded into smoke streamers with a waterfall effect.

There is evidence that the enemy also is experimenting with balloon and parachute bombs. Crews over Europe have seen red balloons rising toward a formation and exploding with a red flash at about the same altitude. A white balloon with an attached cable was released by an ME-110 close to a formation of B-17s over the Mediterranean. Parachute bombs were reported in use over Sicily this spring. Over France a small red parachute has been observed dropping from above supporting a small unidentifiable object. In at least one instance, the enemy has dropped aerial mines, in addition to bombs, in front of the lead group of bombers.

Up to date, air-to-air bombing has obviously been largely of an experimental nature, with little or no pattern to it. But it is definitely listed as an enemy tactic, and some pilots have expressed the belief that, if perfected, it could become a threat to tight formations. The attacks have been numerous enough to score, by the law of averages, a certain number of hits; but regardless of the number of hits, the enemy apparently hopes air-to-air bombing will affect our crewmen and impair the effectiveness of our missions. So far he has been unsuccessful.

DECOY METHODS. In an unsuccessful attempt to lure our troops into ambush in New Guinea, the Japs set up captured weapons abreast of our positions, fired other captured weapons to dupe our men into believing we held those places, and even posed the body of a dead United Nations soldier in view of our troops hoping they would send a rescue detail into the trap.

LOADED PURSE. During a German bombing raid on one of our bases in North Africa, a shower of spikes, watches, wallets and facsimiles of K rations came down along with the enemy bombs. An Arab, who happened to be standing near an American soldier, picked up one of the wallets. It exploded, killing them both.

NIGHT FLARES. When Nazi bombers discover our night fighters trailing them they sometimes drop a sodium delayed-fuze bomb which greatly impairs the night vision of the fighter pilot. To counteract this, the pilots duck into the cockpit and close their eyes until the glare is passed.

The Jumping Italians. An operation involving about 150 Italian paratroopers, dropped at a coastal point during the North African campaign, is submitted as a perfect case of SNAFU.

The chutists were dropped so far from their rendezvous they found themselves among Arabs; ration containers were dropped before the jump but the troops were unable to find them; radio sets were ripped from their chutes and smashed; many of the water containers dropped were found to be empty.

Their mission was to destroy aircraft on Allied fields, with our bombers having top priority. But the operation resulted in only minor damage to one of our airfields.

Just to top it off, the entire group was easily captured. Only two chutists showed any sign of aggressive activity, and there was ample evidence of deliberate betrayal in order to surrender.

Rag Mine. Examples have been reported of the enemy slipping a rag containing a small package of gunpowder between the gas line and exhaust pipe of unguarded motor vehicles. During the African campaign, one jeep driver, noticing a bright light coming from under the hood, found a rag and threw it out. It exploded on the road.

Hot Water. The canteen of a prisoner may look harmless enough, but you can't always be sure of what's inside. For example, surrendering German soldiers have been known to conceal small automatics in these water carriers. This is accomplished by splitting the aluminum container down its entire length, inserting the weapon, fitting the halves together again and replacing the canvas cover. Since the weight of the automatic is about the same as the customary water supply, the ruse is difficult to detect without close inspection.

Cushioned Landing. Nazi mountain troops are reported to have been dropped successfully from aircraft without chutes. The jumps were made over Norway into snowbanks from an altitude of approximately thirty feet.

Guiding Light. While approaching his target—Kahili airdrome on Bougainville—on a B-17 night bombing mission, one of our pilots noticed a Jap reconnaissance plane flying a parallel course at the same altitude but out of range. As they neared the target area the Jap turned on a bright searchlight. Shortly afterward anti-aircraft opened up with extremely accurate flak, thanks to the setting of the B-17's altitude and speed by the Jap reconnaissance plane. However, the run was made and the targets hit with two 2,000-pounders.

Construction Camouflage. At Munda the Japs began building runways without clearing the trees from the area, laying the surfacing around the trees in an attempt to avoid detection during the early stages of construction. We discovered the ruse and bombed the budding runway.

Night Airdrome Defense. Night intruder raiders from the British Isles, swooping low in strafing attacks on German airdromes, have been momentarily confused by lights which look as if planes were snaking their way along the runway. The lights are mounted on a boom which is carried by an anti-aircraft truck. On other occasions, raiders have encountered the fire of anti-aircraft guns concealed in dummy planes which "taxi" out when the attackers approach.

Italian Latrine-o-gram. If you don't think enemy troops are fed the old hokum—and thick—you might dip into the diary of a certain Italian soldier.

This guy was a B-17 fan. He called it "the famous Flying Fortress which was to astonish the world." But even he was leery of the stuff they had told him about B-17 pilots.

"They say that sixty percent of the pilots are women," he wrote in his diary, "but I really do not believe it although one of the women pilots is said to have been made a prisoner from a plane shot down by pursuit planes."

Then the final touch. "They say she had a lacerated breast," wrote the Italian.

TICKET TO ARMISTICE

USE THIS TICKET, SAVE YOUR LIFE
YOU WILL BE KINDLY TREATED

Follow These Instructions:

1. Come towards our lines waving a white flag.
2. Strap your gun over your left shoulder muzzle down and pointed behind you.
3. Show this ticket to the sentry.
4. Any number of you may surrender with this one ticket.

JAPANESE ARMY HEADQUARTERS

投 降 票

此ノ票ヲ持ツモノハ投降者ナリ
投降者ヲ殺害スルヲ嚴禁ス

大日本軍司令官

Sing your way to Peace pray for Peace

Post cards bearing this little invitation to surrender were scattered about Guadalcanal by the Japs during the early days of our invasion there. On the opposite side of the card, in an attempt to make the invitation more enticing, was printed the picture of a comely nude (so comely and so nude that postal authorities won't permit our printing it), and strictly occidental.

The Japanese writing on the card instructs Jap sentries as follows: "Ticket to armistice. The bearer of this ticket is a surrenderer. It is strictly prohibited to kill this surrenderer." It is signed by the "Japanese Imperial Army Commander."

All this came from the same guys who gave such "kindly treatment" to our airmen who were captured after the raid on Japan.

P.S. The boys answered the invitations—with bullets.

Over-the-Shoulder Orders. A Nazi colonel ordered his driver to blow up his staff car. He then stepped aboard a JU-52 and left Cape Bon Peninsula for the safety of the homeland. The Nazi driver watched his colonel take off in the half-loaded transport, filled the staff car with fellow soldiers and rushed off to the nearest Allied POW camp.

No Driver's License. Our bomber crews continue to report enemy-operated B-17s over both France and Germany, and in one case they have spotted the Germans flying a captured P-47.

The B-17s obviously are being used to observe our formations and probably to act as decoys. They undoubtedly also serve as practise targets for German fighter pilots.

The P-47, accompanied by an ME-109 and an unidentified aircraft, made several approaches at one of our bomber formations over France without attacking. ☆

BAIL-OUT AT 40,000 feet

First person account of a record high altitude parachute jump, made to test the AAF's bail-out oxygen system.

Before take-off, Colonel Lovelace poses (below) in the position he later assumed to step off the bomb bay platform at 40,200 feet.

By Lieut. Col. W. R. Lovelace

CHIEF, AERO-MEDICAL LABORATORY, WRIGHT FIELD

HITTING the silk at 40,000 feet may become common before the end of the war. We have the planes to fly up there and we know that our bail-out oxygen equipment will function in the thin, frigid air. We know this because it was tried on June 24 when I bailed out of a B-17 to make certain the oxygen system would work under actual conditions.

Although high altitude flying was not new to me, jumping definitely was brand new. I never had made a jump before. In addition to setting a record, it was an experience that may make such jumps safer in the future. Aside from my personal reactions, the eight-mile descent revealed many factors essential to preserving life and health when abandoning a plane in the substratosphere.

To profit from the experience gained on this jump, you really should make the jump yourself—minute by minute, second by second.

To do this, I'll ask you to step into my shoes, the GIs that go over two pairs of woolen socks.

Next, you put on your oxygen mask (a new A-14 type) and hook it up to a constant flow commercial size oxygen cylinder that is on a two-wheel cart. The oxygen hose to the cylinder is about fifty feet long. It isn't time to fly yet. Instead, you are going to breathe 100 percent oxygen for a half hour while playing baseball with the other three members of the flight team—Boeing flight test engineers.

The time is 1000 o'clock. The ground temperature is close to 80° F. You take calisthenics, then toss the ball around for a while. It's good exercise and it doesn't take long to work up a healthy sweat. At the end of the half hour, you call time and amble over to the B-17 that is on the flying line already gassed up. The cart with the oxygen cylinders is wheeled along with you so you won't have to take that oxygen mask off.

The half hour you just spent was an all-important prerequisite to the experimental flight. During the exercise period you squeezed all of the nitrogen out of your blood, muscles and joints—a process that is technically known as denitrogenation. Aero-embolism is the price you may

pay if you don't take this precaution. Aero-embolism is a first cousin of the "bends," except that on return to sea level pressure from altitude you lose all the symptoms of the attack that was caused by bubbles of nitrogen.

Upon reaching the plane you put on your high altitude flying gear. Over your chino uniform you don the latest two-piece chicken feather suit developed for high flyers. Next, your fatigue overalls, the ones that have the bail-out bottle, altimeter and stop watch sewed into them.

You slip on your flying helmet, earphones and B-7 goggles—for you are wearing the new A-14 oxygen mask and your face is completely covered. Next comes the all-important parachute backpack and an emergency pack on your chest. You put a pair of silk gloves on each hand and a pair of woolen gloves over them. You crawl into the plane, detach your oxygen tube from the cylinders on the cart and hook into the bottle that carries your supply in the plane. Then, you slip on a pair of leather and rayon mittens that almost come up to your elbow.

YOU'RE all set, and you're on your way at 1123 as the big plane rolls down the runway. Pilot, co-pilot and flight engineer are your crew members. As soon as you're off the ground you start noting instrument readings since this is a flight to obtain practical test on equipment with complete data on all that happens.

First on the check list is the oxygen regulator, not only yours but those of the rest of the crew. You check them and the oxygen pressure of each cylinder. Months have been devoted to preparation for this flight and you can't let any symptoms of trouble pass unnoticed.

The altimeter never falters but keeps going round and round at about the speed of the second hand on your watch. You have forgotten that you are going to make your first parachute jump—a jump during which you may lose consciousness if you lose your oxygen supply for more than fifteen seconds.

It has been ten minutes since take-off, you note by the sewed-in stop watch on your sleeve. Time to check the pulse beat, color of lips and fingernails of your crew. If they should turn blue, you know the oxygen system isn't functioning properly. You make the check and find everyone is normal. So far, so good. You stroll back to the bomb bay, keeping the ten-foot special oxygen hose on your left side so it won't foul on any part of the plane. It's a short walk—no trouble to do it later on when you will step onto that small platform after the bomb bay doors are opened. You return to your post behind the co-pilot. Standing back of him you again glance at the regulators that are feeding in the oxygen—pure oxygen. Time for another pulse check. Everyone still is doing fine.

The earth has dropped away far below and you still climb steadily upward. You are too busy to evaluate your flight, though, for you are checking the oxygen regulators, the pressure dials, the pulses of your crew until finally you are over 40,000 feet. You had almost forgotten that this flight is the one from which you are going to jump. You look at your check list which was carefully prepared so no slips could be made in the rush. You are being hurried now because one engine is not running smoothly.

Number one on the check list, take off the head-set. Number two, walk back to the bomb bay and step on the platform, keeping your oxygen line on the left side. Number three, have flight engineer fasten parachute to static line so chute will be opened immediately. Number four, have flight engineer open bomb bay doors. Number five, turn on bail-out oxygen supply and check to see if it is operating satisfactorily. Number six, detach hose from the plane's oxygen supply. Number seven, before you can think about it, you step off into space . . . tape line altitude 40,200 feet, pressure altitude 39,750 feet, time 1233, temperature —49° F., speed 100 mph indicated, 200 mph corrected.

You see a huge shape passing over you; it is the belly of the B-17. The tail is overhead and the engine drone is receding. You feel a terrific jerk as the parachute billows open—a jerk that throws your gloves off, you remember. Then you don't remember, for you have been knocked unconscious by the jolt.

A sensation of lazily floating on a dream cloud comes over you while something is droning in the far away and everything else is quiet, very quiet. You vaguely recall an altimeter reading of 30,000 feet. Then, it is quiet, very quiet, with that far-away hum and you look down to see the earth gradually coming to meet you. You are breathing the oxygen from that little cylinder sewed into your suit until the pressure finally drops down to zero. The altitude is 15,000 feet so you don't need additional oxygen anyway. The bail-out cylinder had plenty. Your senses begin to sharpen now. It still is very quiet except for the droning of airplane engines. You hadn't noticed the cold but you feel the warm air now.

THEN, you see a plane—the AT-6 that was to pick you up. You're at 8,000 feet now and you wave to the men in the plane to let them know that you are OK. Down below is a huge expanse of an already harvested wheat field. You see the big B-17 you left eight miles up has come down with you. The AT-6 swoops down for a landing. As you hit the ground, you run with the wind (for you landed downwind), collapse your chute and the jump is over. But your left hand is awfully cold when you touch it. The hand must have frozen for there's no glove on it. Your right hand is still covered by the snug fitting silk glove.

Within two minutes, the AT-6 crew is with you. The pilot helps thaw out your fingers by holding (Continued on Page 48)

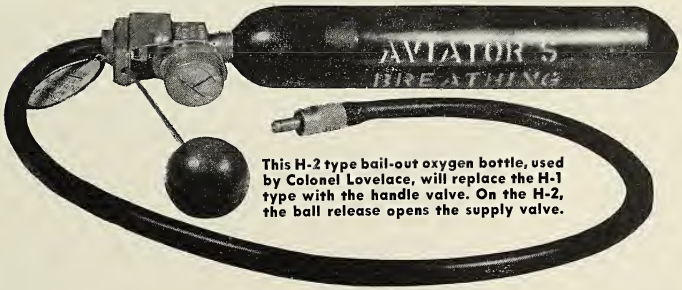
COMPUTING ALTITUDE

The parachute jump of Lieut. Col. W. R. Lovelace was made from 40,200 feet density altitude and 39,750 feet pressure altitude.

Density altitude is approximately "tapeline" altitude. Aero-dynamically, airplane performance speed, propeller pull, lift of wing, trajectory of bomb is judged by this figure.

Pressure altitude, which may be either greater or less than density altitude, is determined by the actual reading on the altimeter. Physiologically, human performance is judged by this reading. Horsepower delivered by the engines of an airplane also is a function of the actual pressure of the outside air.

Use of oxygen equipment and the probability of an airman getting the "bends" and anoxia depends on the actual reading of the altimeter in the airplane and not on the true height above sea level. An error in judging the numerical altitude by 2,000 or 3,000 feet in the 35,000-45,000-foot range may induce anoxia before a pilot is aware of his predicament.



This H-2 type bail-out oxygen bottle, used by Colonel Lovelace, will replace the H-1 type with the handle valve. On the H-2, the ball release opens the supply valve.

Notes from the Air Surgeon's Office:

How to Keep Well in the ITALIAN THEATRE

Brig. Gen. David N. W. Grant

AIR SURGEON

ENEMY bullets, anti-aircraft shells and other man-made implements of war are not the only hazards to the health and lives of Army Air Forces personnel now fighting in the Italian theatre.

Though not as grave, perhaps, as those abounding in more remote areas, many diseases prevalent along this north-central Mediterranean coastline can seriously deter military operations unless sufficient precautions are taken to prevent their contraction.

Generally speaking, sanitation in this area is very poor. Italy has always been faced with a serious public health problem, and health conditions are even more acute in the islands of Sardinia and Sicily. The ceaseless Allied bombing of much of this area and the strain of more than three active war years have lowered considerably even those health standards which normally existed.

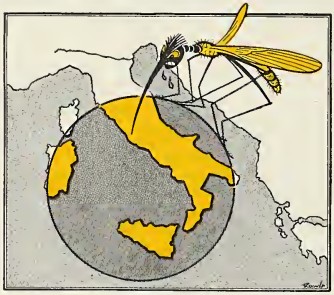
Water and sewage facilities are extremely inadequate except in very few of the larger communities. In some cases municipalities obtain water from lakes and reservoirs in the hills and mountains and transport it from these surface collections by means of aqueducts. In rural areas shallow wells, springs and streams are used. Many water supply systems are ancient and, for one reason or another, are frequently cross-connected with sewers.

Sewage treatment systems are rare in this area. Sewage is usually emptied raw into streams or into the sea. Pit privies are generally used in rural areas and in many of the slum sections of larger cities. Human waste is frequently collected by cart and used as crop fertilizer.

The high rate of typhoid and paratyphoid fevers, particularly in the vicinity of Rome, indicates that water is frequently contaminated. For the purpose of military forces going to the Italian theatre, all water must be considered dangerous and should be treated by military personnel before use.

Pollution of the soil also renders fruits and vegetables unfit for eating unless they are dipped in boiling water. Milk, too, should be boiled for there are few facilities for pasteurization in this area. Tuberculosis and undulant fever are common in dairy herds.

Of the insect-borne diseases, malaria is by far the most prevalent in the Italian theatre. The Romans centuries ago shied away from the Pontine Marshes, expansive swampland along the Tyrrhenian Sea coast west of Rome, because they believed evil spirits were in the air over this area. The "evil spirits" happened to be mosquitoes but their precautions were well founded. Although the marshes were drained—mainly to reclaim land for economic use—by the fascist regime several years ago, malaria still abounds in this section of the Italian boot. Italy's malaria



rate is among the highest of the Mediterranean countries, and that of Sardinia is considered to be the third highest of any area in the world.

Throughout the Italian theatre, troops should be particularly on guard against malaria-bearing mosquitoes. When you go out after dark, wear long trousers tucked into boots or leggins, and long-sleeved shirts. Use mosquito repellants, headnets, gloves and mosquito boots whenever possible. Sleep under mosquito nets.

Dengue or breakbone fever, also mosquito-borne, is prevalent in the coastal areas. Although this disease is rarely fatal, it is incapacitating and, should it reach epidemic proportions, it could seriously hamper the military effectiveness of troops. The same mosquito which carries dengue also is the carrier of yellow fever. This disease, however, has not been found in Italy for many years, but the return to the country of infected individuals or the transmission of an infected mosquito by plane or ship from a yellow fever area could cause the rapid spread of the disease.

With this possibility in mind, Army Air authorities have been careful to spray with insecticide the planes taking off from points in central and west Africa for Mediterranean bases.

The presence of disease carrying ticks, lice, sandflies and the like in the Italian theatre makes it necessary for military personnel to take additional precautions against insect bites. A new GI powder repellant for use against creeping and crawling insects has proved particularly effective. Troops should bathe whenever possible, examine their bodies carefully for ticks and lice, and inspect their wearing apparel frequently.

Mediterranean tick fever, or Boutonneuse fever, is found throughout Italy and Sardinia. It is borne by dog ticks and is much like our Rocky Mountain spotted fever. Typhus and relapsing fever are two louse-borne diseases common in this area.

Here, as in other war theatres, utmost care should be exercised by military personnel to avoid venereal diseases. Syphilis, gonorrhea and chancroid are prevalent in Italy. Normally, prostitution is controlled by police laws requiring segregation and medical examination at weekly intervals, but considerable laxity in enforcement is to be expected under the stress of immediate military operations.

In summary, it should be borne in mind that simply because this theatre of operations happens to embrace a section of the world that is highly civilized, in contrast to many of the areas in which our troops are fighting, health precautions must not be tossed overboard. This theatre, if anything, has more than its share of health hazards in peacetime, and as the scene of active combat operations these hazards are multiplied manifold. ☆

AN *Open Letter* TO MEN OF THE ARMY AIR FORCES

It is a privilege to reach the men of the Air Forces through our official service journal as it gives me an opportunity to tell them of the wonderful work their wives and mothers are doing, and to ask them to cooperate with us more and more as time goes on.

You know, we wives and mothers of the Air Corps are red-blooded, self-respecting American women who want to do our part in the organization to which our men belong. We want to take care of the home front while our men are fighting or in training. Our first responsibility is to our homes and children; our second, to see that our Air Corps family is kept busy and happy.

We already have made an excellent start. Through training in Red Cross classes, we are taking our places in volunteer work of various kinds. In some places our Air Corps hospitals are being supplied with dressings and other articles made entirely by Air Corps women in post Red Cross auxiliaries. We have nursery schools on many posts. There are canteens in operation, manned by wives of Air Corps men. The cadet wives in some training centers are organized to take care of the housing situation.

The Air Forces Branch of Army Emergency Relief is using volunteers to help in its relief work in many locations. Mrs. Barney Giles has recently been appointed to organize Army Emergency Relief Volunteers in the Air Forces Branch, as the duties of the Army Emergency Relief officers are growing more complicated as time goes on, at all posts, and the need for volunteers is increasing. Air Corps Mothers Clubs are being organized all over the country; their aims and purposes are to make it happier for their boys and for the boys of other Air Corps mothers who are not at hand. In one city the Air Corps Mothers Club has a sewing room where any cadet can bring his clothes in need of repair, and find an interested and capable "mother" to take care of him.

In addition to such volunteer activity, there are many fields of endeavor in which the women of Air Corps families are busy doing war work—airplane factories, for instance. In fact, in industries of all kinds they are taking their places to relieve men who are needed in the Army.

Yet, there is much more to be done. I am asking you to help in seeing the problems and to cooperate with us in carrying out plans for the future. If near a post, there is work to be done in the chapels, libraries, hospitals and Army Emergency Relief. On some posts, the Red Cross auxiliaries are already organized and doing fine jobs. We need more auxiliaries. We need volunteers on relief committees in the Army Emergency Relief. We need sympathetic Air Corps women to help morale among the enlisted men's families when tragedy strikes; it may be just a note of sympathy—a word to say, "Call on me if you need help."

We are all one family. We need the backing-up of our husbands to do some of these things, especially if new in the Air Corps. After a visit to many of our camps that have sprung up over night, I found the most urgent need to be a Bureau of Information for the women who come to see their men at camp—often to say "goodbye."

Someone wrote me the other day and said, "Can't something be done to keep these wives at home? There is no place for them around here—even for a day or so."

I say the Air Corps women are loyal and devoted to their husbands and that nothing in the world can keep them from going to say "goodbye." Therefore, it seems a simple thing for us who have spent many years in the service to at least have a desk where questions can be answered on transportation and housing and on many other important subjects. This can be, and often is, done by auxiliaries on our posts. Where there are no auxiliaries, let it be a function of the Army Emergency Relief Office and man it with volunteers of the Air Corps. There is no necessity for civilian organizations to take over duties which are rightfully ours.

Please—put the feminine members of our big family to work! They want to help and you may rest assured that while you are in far places we will do our utmost to take care of those left at home, for, as in the words of Martha Merrell's lovely poem, "Nothing can ever break the tie that binds the wives of the men who fly."

Eleanor P. Arnold

MRS. H. H. ARNOLD

BETWEEN MISSIONS

With the AAF around the World

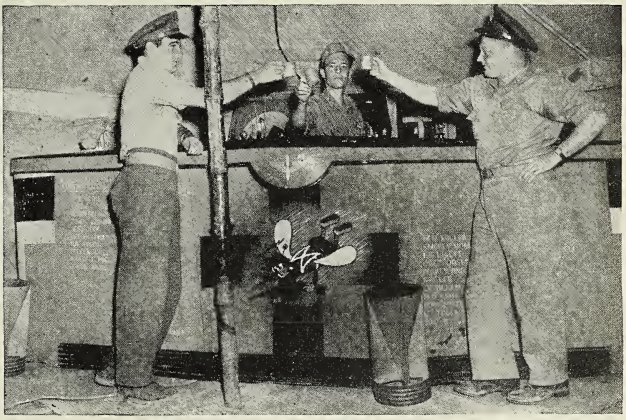
BEACH PARTY. Sunny Florida? No indeed! These men of a heavy bomber squadron enjoy the beach and surf on a South Pacific island.

WHILE every theatre of operations has its own peculiarities, bunk fatigue and relaxation between missions is pretty much the same the world over. The boys read; they write home; some go sightseeing when there are sights to see; they play cards; they build and patronize their own clubrooms; they play ball and a thousand other games they've made up for their own diversion; they play in the surf when there's a beach nearby. In a few choice spots there's even feminine companionship to be had. But here are a few of the stag activities engaging AAF personnel around the globe.

LONDON TOUR. St. Paul's Cathedral in London, surrounded by scars left by German bombers, is a sight these two Yanks will long remember.

BATHROOM BALLAD. While not as modern and shiny as that tiled shower at home, this halved gasoline barrel suffices in Alaska. And the vocals are the same.

THE PASTEBOARDS. A little game of fan-tan occupies the time of these members of a B-25 crew in China as they await word to take off on a mission over Jap-held territory.



UNIQUE SCRAP HEAP. This bar in North Africa is made of salvaged parts from enemy planes: front panels are ME-109 wings, rail from a JU-88 and the top from a French plane used by the Nazis. The bomb fins hold cigarette butts quite adequately.

RELAXING 'ON THE SET.' These fighter pilots lounge on bunks during a "stand-by alert" at their Caribbean airbase.

WARM-UP. The great American pastime is a lot of fun even in the Aleutians. Does it matter if a righthander uses a lefthander's mitt?

OUR NEW AVIATION CADET PROGRAM

By Lieut. Col. Willis S. Fitch

CHIEF, AVIATION CADET BRANCH, HEADQUARTERS, ARMY AIR FORCES.

A cadet at Brooks Field, Texas, looks into the future.

SOME time ago our office received the following telegram:

WAS NOTIFIED WOULD BE CALLED TO ACTIVE SERVICE ON . . . . . HAVE USED ALL GAS, COFFEE, SUGAR STAMPS. SOLD AUTO, FURNITURE, CLOTHES. QUIT JOB, WIFE. MADE WILL AND PEACE WITH MAKER. AM TEMPORARILY LIVING IN MANHOLE. IF THROUGH ERROR WAS ENLISTED FOR NEXT WAR, CHANGE TO THIS ONE.

We've received others like it from eager and impatient enlisted reservists.

It is no secret that during the early stages of the war it was out of the question to build and expand training facilities rapidly enough to accommodate the vast numbers of men who flooded the Army with their applications. Some of those accepted had to wait weeks or even months before beginning pre-flight work.

Thousands of enlisted men as well as civilians were rejected for one reason or another upon application for flight training. Our educational and physical standards were rigorous. This tradition of the AAF undeniably caused many disappointments.

Today, both sides of the picture are greatly changed. The purpose of this article is to set forth the "how" and "why" of such changes.

Creation of ample training facilities was in itself a huge undertaking—construction of scores of airfields, production of aircraft, building of various classroom training devices and the like. All this has been accomplished. In addition, more than 100 of the country's top-ranking colleges and universities have been brought into the academic phase of our flight training program. A man who is now accepted for aviation cadet training in the AAF begins intensive work within the month of his acceptance.

Throughout, it has been the Army's policy to maintain the quality of training at the highest possible level. Anything less would have been unfair to the cadet himself, would have been a military inefficiency. Delay in training was far preferable to the alternative, a lowering of training standards.

Proof that quality of training has been sustained is the fact that, even in a stepped-up tempo of wartime, more than 95 out of 100 pilots are being trained without injury of any kind. This achievement has received recognition from the National Safety Council which on June 22, 1943, presented to the Commanding General of the Army Air Forces a special wartime award for "Distinguished Service to Safety."

Educational and physical requirements for flight training were adhered to for the same reason. Here, however, there was another consideration.

An Air Force is primarily a striking power. As such it depends upon an extreme degree of teamwork all along the line, particularly among members of a bombardment crew. It was and is essential that such crews be composed of men eminently adapted for the work.

Had standards of any kind been lowered at the outset of the war—without benefit of battle experience—the entire success of the AAF might have been materially affected.

But with nearly two years of war behind us we have discovered many things. It has been found, for example, that some graduate Ph.D.'s fail to display any aptitude for military flying, whereas some men with only one or two years of high school education become expert.

Likewise it has been discovered that certain physical requirements did not warrant the importance given them. Dental qualification was a case in point. Our requirements in this regard today might well be summed up by the statement, "If you can eat, you can fly."

In other words, after extensive study and analysis, after careful examination of the experience not only of our own Air Forces but those of England and Canada, we concluded that certain requirements for flight training could safely be made less exact—safely from the standpoint of the student, safely from the standpoint of military efficiency.

That is the "why" of recent changes introduced in our Aviation Cadet program.

What are the present requirements?

First, physical attributes. The requirements for both visual acuity and hearing have been altered slightly. An applicant whose visual acuity measures as low as 20-30 in both eyes—correctible to 20-20 in both eyes—will now be accepted for air crew training if otherwise qualified. The minimum hearing requirement now permits 15-20 hearing in one ear, while the 20-20 standard in the other ear is still demanded.

Restrictions as to teeth, height, weight and other physical conditions have been modified. This includes the standards concerning feet. The day is long past when a flat-footed man might have trouble with the pedals of an airplane.

Lack of a formal education is today no handicap, since our tests for aviation cadet training are designed primarily to determine flying aptitude. Practical judgment and rapid perception are the basic necessities rather than education. Experience as a mechanic or as a soldier is quite as apt to be an advantage as a college degree — particularly since the passing grades of academic examinations have been lowered. This latter point should be of particular interest to many men who were borderline cases in the first bout with the cadet examinations.

Suppose you are an enlisted man, want

War experience has wrought many changes in requirements for flight crew training.

to fly and feel you can pass these moderate requirements. How do you go about it?

Virtually all airfields and airbases have aviation cadet examining boards. If there is none at your field there is certainly one in a nearby city and your commanding officer will grant permission for you to visit it.

You can obtain an application from the CO of your field. Or, if for some reason you prefer it, you can probably obtain forms from such organizations as the Red Cross or USO or from any U. S. Army recruiting station.

You must be a citizen; must have passed your 18th birthday and not reached your 27th; you must accompany your application with a copy of your birth certificate and three letters of recommendation.

When the aviation cadet examining board receives these documents, you will be given an appointment for examination. The mental screening test takes less than three hours. The physical examination will require several hours.

If accepted for aviation cadet training you will be transferred to the Air Corps on an unassigned basis. This means that you will be definitely transferred out of the unit with which you have been stationed. Even if it subsequently should be "alerted" for overseas duty you will be given your opportunity to stay in this country for flight training.

Another point of considerable importance is the new provision by which you may retain your rating.

An aviation cadet in active training receives $75 a month plus a monetary allowance of one dollar per day subsistence. In addition, he receives quarters, medical care, uniforms and all incidental equipment, and is given a $10,000 government life insurance policy while undergoing actual flying training (which must, however, be continued at his own expense after graduation).

An enlisted man who holds a rating may, during the period of training, obtain the alternative status of aviation student rather than aviation cadet. This means that he will be paid on the basis of his rating and can maintain dependency allotments and other benefits.

As was stated previously, the man accepted for cadet training can expect to begin such training within a month. He will first be sent to a classification and basic training center. There further tests will be given him to determine whether he would be best suited as pilot, bombardier or navigator.

If he has had basic military training he will then be sent promptly to one of a selected list of colleges for a five-month period to receive some further military instruction, physical conditioning, and—toward the latter part of the course—some flying. He will also take up several courses of study designed to help him in his subsequent pre-flight and academic training. These courses will be assigned to him in accordance with his previous education.

If, incidentally, he has not been found well adapted to the requirements of a pilot, bombardier or navigator, he may still have the opportunity of becoming a member of a combat crew by being assigned to an AAF technical school and subsequently to flexible gunnery training.

Granting, however, that he is sent to a college, an aviation cadet or student upon completion of his five-month college course will go at once to a pre-flight school.

There, in a nine-weeks course, he will obtain instruction in engines, aircraft structures, theory of flight, meteorology, radio and communications practice, aircraft identification and other allied subjects.

He then will begin actual flight training, going through the three stages of elementary, basic and advanced training, and upon graduation receive the rank of flight officer or second lieutenant. Both ranks carry the same pay — $246 per month for single men, $327 per month for married men, which includes fifty percent extra base pay for flying duty, subsistence and quarters allowance if required. In addition, a uniform allowance of $250 is given to each officer upon graduation.

Our new aviation cadet program is designed to give every man who wants to fly a chance to play his part in the future of American aviation. ☆

PREPARE FOR INSPECTION

ADMINISTRATIVE • COMMUNICATION • TACTICAL • TECHNICAL

TIMELY ADVICE FROM THE AIR INSPECTOR

Matters presented here are informative only, and are not to be considered as directives.

PROPER ASSIGNMENT OF PERSONNEL: We know a base administrative inspector who checks on ten assignments of personnel a day to see that the right man is on the right job. The inspector is building morale plus, and, in addition, is assuring that the base is getting the most out of its men.

Proper assignment is a *responsibility of command* (AR 345-5). Assignments made by a commander are a criterion of his efficiency. They are not to be made for his sole convenience, but for the benefit of our war machine as a whole.

To the individual, malassignment often becomes a morale deterring factor which causes the soldier—officer or enlisted man—to become a liability instead of an asset.

Much has been done to assure proper assignment in the Army Air Forces following a conference in Washington of personnel officers of the Air Forces and commands, but correction is a constant process. Check and check again on malassignment.

BIG AND LITTLE: Squadron Supply Officers: Those big and little men in your organization may get cold feet—and not from meeting the enemy—if you land them in the Aleutians without extra shoes to fit them. POM inspectors checking at final phase training stations to see that you do not make this mistake report that they must remind many of you to submit requisitions for six months' maintenance of special measurement or nontariff size clothing.

CHECK BEFORE FORCED LANDING: If the airplane in which you fly is equipped with an emergency sea-rescue transmitter, are you as familiar with it as you should be? Do you know where it is stowed in the ship? Do you know how to unpack it, assemble it and get it operating? This is an efficient and useful piece of apparatus in case of forced landings, especially at sea, but it isn't much help if it is allowed to sink with the plane. An instruction book is packed with the set, but it is a good idea to know something about the equipment before you find it necessary to open the package.

KNOW YOUR ALLIES: To salute or not to salute—that is often the question overseas when a man in an Allied uniform comes into camp. To keep you posted, WD Training Circ. 70, May 21, 1943, directs that all military personnel will be instructed so that they will be able to recognize the commissioned personnel of the principal Allied nations. This instruction will be given in training and staging areas and aboard transports.

Keep that mechanic on the line . . . and we don't mean typing line.

CRASH TRUCK CHECK-UP: Notes from the scratch pad of a technical field inspector after checking on crash trucks:

"Crash kit incomplete and improperly maintained. Some tools rusty. Low speed hack saw blades in kit. (TO 00-30-44) . . . Short on Asbestos suits. Suits improperly stored (TO 13-1-7) . . . CTC fire extinguisher low in pressure. . . . CO_2 fire extinguisher equipment not stenciled as required by TO 16-20-2 . . . Flashlights not kept in a suitable metal container, and no record of flashlight inspection available. One light inoperative. No spare flashlight batteries on hand (TO 00-30-44)."

What is the condition of your crash trucks?

AIRCRAFT MAINTENANCE FORMS: Crew chiefs and engineering personnel, you are reminded by technical field inspectors of the importance of keeping up aircraft maintenance forms. It is only through the use of these forms that historical records of the planes can be preserved and necessary maintenance performed. Frequent inspections of such forms as Nos. 1, 1-A, 41-A and 41-B are necessary to assure that they are kept properly at all times.

THE INSPECTOR IS IMPRESSED: Use of the telephone to save rubber and gas was graphically demonstrated for a major from The Air Inspector's office when he called for a car to take him from a western railroad depot to an airbase ten miles away. The girl driver who appeared at the station apologized for being a few minutes late, explaining that the motor pool dispatcher had telephoned the main gate at the base as she was leaving and instructed her to pick up an express package on the trip to town. The major assured her that there was nothing like "killing two birds with one stone."

While driving through town enroute to the base, the driver stopped the car and said: "I have to stop at that drugstore over there and telephone the base to see if there are any other assignments in town. The free use of the phone is one of the store's contributions to the cause."

The inspector was duly impressed.

PARACHUTE TOWER HAZARD: A technical field inspector noticed a snagged parachute in his inspection of a parachute room at a west coast base. Seeking the cause, he found exposed nails in the tower. If you are a parachute rigger, you should "spike" this possibility of torn parachutes by looking over the walls of your tower today.

KEEPING THE GASOLINE FLOWING: "You have to keep 'em rolling to keep 'em flying."

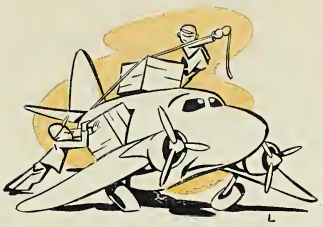
These words were never more true of the big AAF fuel servicing trucks than they are today. They are being called on to make long hauls of gasoline, which often test the metal of the trucks to the limit. More severe usage calls for better

maintenance. Technical field inspectors are stressing this fact wherever they go, and your compliance may mean the difference between planes in the air and planes on the ground.

Hospital Fighting Men: Just because a germ has your serial number on it, soldier, and you land in a hospital you have not been scratched off the list of potential fighting men. Your training is carried on.

AAF Memo. 25-9 provides for a convalescent training program in all AAF hospitals. This program is designed to prepare patients for full military duty by carefully supervised physical training and by a course of military instruction.

Inspectors can be of considerable help in assuring the utilization of convalescence time for training. They should check especially to see that training aids such as films and film strips are available, and that there is coordination with such men as the special service officer, Red Cross representative and chaplain.



Breaking the Plane's Back: A cross-country truck driver knows the weight of his load just as readily as he knows his own age. And, if it is important for him to know that, it is twice as important for a pilot to know the weight of his plane load.

With the increase of gross permissible weights, the importance of never loading airplanes beyond these limits is greatly increased. Technical inspectors in the field report, however, that some pilots are not paying sufficient attention to the gross weight of their aircraft and are unable to estimate it within 1,000 to 2,000 pounds.

The center of gravity location is equally important. It can be found by the load adjuster, supplied with most modern aircraft.

Good from Bad Weather: "Ceiling zero."

That is the signal in a tactical organization for a take-off on administrative work. Squadron commanders, you may be able to improve your administration greatly by checking to see whether those non-flying days are being fully utilized.

Tactical Inspection: To make your organization second to none in combat, your tactical inspector is stressing:

Constancy of supervision.

Teamwork.

Realism in Training.

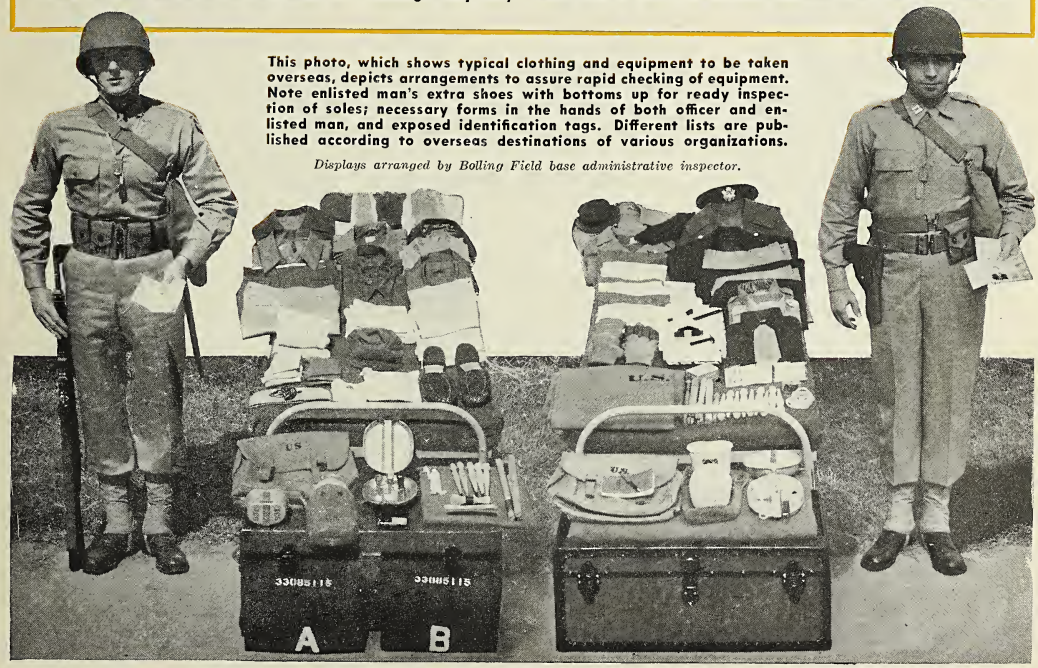
Planning of training flights, wherever possible, over terrain similar to that in which the unit will operate overseas.

Familiarity of pilots with the types of hostile aircraft likely to be encountered, their armament, armor and fields of fire.

(Inspection Continued)

Showdown Inspection: **Attention: commanding officers of Overseas Replacement Training Centers.—It is your responsibility to see that officers and enlisted men going overseas are as fully equipped as possible with serviceable material. Don't wait until the last minute. Every man must be inspected to see that his clothing is properly marked and will stand six months of wear; that his shoes are serviceable; that his qualification firing as been entered on his Form 20. Although they may seem trifling, such details are of major importance and must be accomplished. Every soldier is anxious to know what to do. Help him now with a display.**

To accelerate overseas preparations, POM directs that a showdown inspection be held immediately after warning orders are received. The Air Inspector feels that a permanent display of clothing, equipment and records in proper order, under the supervision of a competent guide and instructor, would allow each man in ORTC to become familiar with what is standard.



This photo, which shows typical clothing and equipment to be taken overseas, depicts arrangements to assure rapid checking of equipment. Note enlisted man's extra shoes with bottoms up for ready inspection of soles; necessary forms in the hands of both officer and enlisted man, and exposed identification tags. Different lists are published according to overseas destinations of various organizations.

Displays arranged by Bolling Field base administrative inspector.

☆ HERE ARE THE ANSWERS

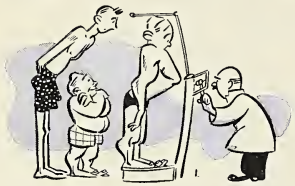
Q. ***Is there a limitation on the amount of dividends an Army exchange may declare?***

A. The amount of dividends distributed to organizations will not exceed an amount equivalent to fifty cents per man per month (WD Circ. 98, 1943).

☆ ☆ ☆

Q. ***What are the size and weight requirements of fighter pilots?***

A. Six feet or less in height, 180 pounds or less in weight (AAF Reg. 35-26).



Q. ***Is the recording of the chest X-ray in the Service Record still required?***

A. No (WD Circ. 137, 1943).

☆ ☆ ☆

Q. ***What is the priority for Quartermaster Corps laundry service?***

A. 1. Enlisted men's laundry. 2. Hospital, government property, Army Transport Service. 3. Officers and other authorized patrons (Par. 14a, AR 210-10).

☆ ☆ ☆

Q. ***May an officer maintain personal files of War Department publications?***

A. No, unless he is assigned to duty of such character that official files are not readily available for reference (Par. 1c, AR 310-200).

☆ ☆ ☆

Q. ***May a flight officer perform any air crew duty?***

A. No qualified flight officer will be denied, because of his grade, the opportunity of performing any air crew duty normally performed by a commissioned officer (AAF Memo. 35-21).

Q. ***Is there a directive forbidding the exchange of shoes that do not fit among enlisted men?***

A. Yes. WD, AGO Memo. S850-31-43 states that if shoes do not fit after they have been properly broken in, enlisted men will be refitted under the supervision of their organization commanders. Under no circumstances will shoes be exchanged with other enlisted men.

Light Up Field Ranges: You are supposed to keep your field ranges (M-1937) gleaming, but the gleam should not be the original one put there by the manufacturer. Take a tip from mess sergeants overseas and start training with the ranges

the day they are first unloaded in your organization supply room. You will know what to do then on a rainy night in Australia when the burners refuse to function and several hundred hungry men are rattling their mess kits. Particular note should also be paid to WD Circ. 143, 1943, which rescinds WD Circ. 359, 1942, and places the responsibility for preventative maintenance, including cleaning, minor repairs and replacement of worn or damaged parts, on the using organization.

Blue or Pink Crystals? Radio operators, do you check regularly the colors of your "chameleon"? The chameleon, of course, is the dehydrator which permits the housing for the automatic radio compass to "breathe." The crystals (silica gel) in the transparent tube of the dehydrator should be a deep blue, but they fade to a pale pink when they become saturated with water absorbed in the very necessary process of drying the air passing into the housing. Saturated crystals can be reactivated by baking at about 400 degrees Fahrenheit until the blue color is restored. One common way is to place a medium power electric light bulb in a coffee can, fill the can with crystals, and turn on the light. Do not employ the simple but ruinous expedient of drilling a hole in the bottom of the housing to permit water to drain off.

Fire Prevention in Hangars: Do you work in a hangar? If you do, AAF Reg. 85-6 should be on your must reading list. You will not find this regulation on fire prevention "dull copy." It tells you how to avoid disaster for yourself as well as for the expensive and vital equipment in the hangar. Some points well worth checking for compliance in your own hangar are:

When planes are brought into the hangar for storage or repairs, either overnight or for a longer period of time, or for repairs after having been serviced with gasoline, great care will be taken to prevent overflow of gasoline tanks from expansion due to change of temperature. Airplanes will not be refueled or drained of gasoline while inside buildings.

Blow torches will be restricted to isolated places in the hangar.

Radio transmitters installed in aircraft will not be tested or operated with the dynamotor running, unless all parts of the antenna system are at least one foot away from any other object. ☆

☆ INSPECTING THE INSPECTOR

Do your inspections stop short of determining the cause?

☆ ☆ ☆

When someone comes to you with a perplexing problem, are you supplying the answer or "passing the buck"? Do you have complete sets of regulations and directives to give answers quickly?

☆ ☆ ☆

Base administrative inspectors, are you concentrating your efforts on alerted units? Are you giving them every possible assistance in their show-down inspections? Are you stressing important items, not picayunish points?

Command inspectors, are you keeping in mind the provisions of POM and AIR POM when you make your inspections during the various periods of training? Commanders of units inspected by POM teams at final phase training stations have stated that they wished they could have been given similar inspections earlier in their training. All "inspection roads" should lead to overseas movement. Your philosophy should be "advise, aid and be sure that responsible persons understand what must be done and how it must be completed prior to readiness date." Such philosophy does not go so far as to excuse gross negligence or even carelessness, but you will find those factors apparent in only a few instances.

☆ ☆ ☆

Are the basic fundamentals of soldiering being neglected due to extreme concentration on specialist training?

☆ ☆ ☆

As a base administrative inspector, are you thoroughly familiar with AR 210-10? This regulation lists the responsibilities of a base commander, and they all are matters to be looked into by an inspector.

☆ ☆ ☆

Are you seeing that there is emphasis on these three points—*Discipline, training, leadership?*

FASHIONS FOR FLYING NURSES

By Cpl. Douglas J. Ingells
Wright Field

FOR years men in the clothing unit of the Materiel Command have been designing high altitude flying suits and other paraphernalia for our airmen who are subjected to the cold of the substratosphere and for ground personnel who keep our planes flying in the frigid temperatures of the Arctic circle.

But now these clothing designers are faced with a new demand in styles for Arctic and high altitude wear—flying suits for the flying nurses of the Air Evacuation Group. These nurses are now flown to all theatres of operations where American troops are fighting the enemy, and they need new types of women's clothes—dress designs that will keep them comfortably warm under any circumstances.

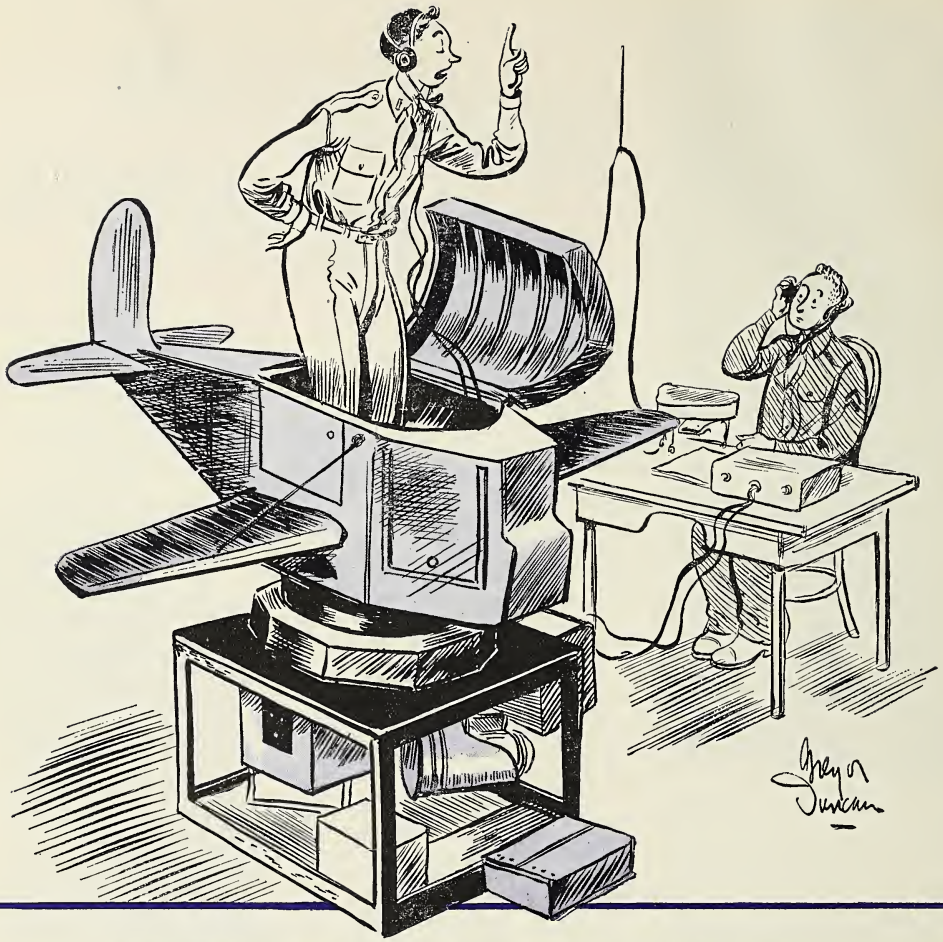
"We realize that for warmth our clothing may have to be bundlesome, but please give us something with some style to it." This was the plea the nurses' commandant directed to the AAF clothing experts in the equipment laboratory at Wright Field. Our tailors went to work, embodying in the designs specifications and recommendations made by the nurses themselves, and soon they came up with a snappy batch of togs that make the flying nurse look like the little lovely who is taking in the skiing season at Sun Valley.

A few of the frigidwear styles are shown in the accompanying photographs. Almost every week now, a new shipment of these garments is flown to Alaska, Greenland, Iceland and other bases to make our nurses the warmest—and best dressed—of them all. ☆

Flying nurses wear this outfit when they aren't in the extreme cold. It is blue-grey worsted two-piece suit (skirt of same material can be worn). Boots are of rubber and felt with sheep shearing. The cloth helmet is wind resistant and Alpaca lined.

In the Arctic cold the girls wear long undies made of cotton rayon. The stuff doesn't scratch, fits skin tight and holds body warmth.

This is the complete Arctic costume for flying nurses: Two-piece light-weight flying suit worn under Parka-type outer garment, Mukluk boots, gloves and purse. The coat is cotton poplin lined with Alpaca, the Mukluks have rubber soles and canvas tops, and the hood is trimmed with wolf fur. The entire outfit weighs little more than eight pounds.



'I WON'T GO A FOOT HIGHER WITHOUT OXYGEN!'

Maybe Charlie is a trifle overcautious—but his instincts are good. He shows the beginnings of a fine altitude attitude.

But he isn't perfect—not yet. Although he knows the life-saving necessity of oxygen at high altitudes and always uses his mask at the proper times, he has a tendency to forget some important details in using his A-10 mask. Such as:

Checking his flow regulator and emergency valve before take-off. (He has left his auto-mix "OFF" at low altitudes a few times, too, thereby wasting his oxygen supply.)

Checking the pressure gauge.

Obtaining a better fitting mask.

Keeping oil and grease away from his oxygen equipment and making sure it's always in *perfect working order.*

Second of a series by the Flight Control Command.

GROUND OBSERVERS CAN TAKE IT

By Charlotte Knight

The AAF relieves a headache for its Aircraft Warning Service by teaching 'spotters' aircraft recognition.

YOU'VE heard 'em; so have we.

Priceless stories about our ground observers—such as the yarn, now worn and tarnished, about the woman who picked up her observation post phone and reported a P-38 to her filter board as "something that looks like two planes with their arms around each other."

Or the one about the observer who spotted a plane "with raglan sleeves, flared bodice and a nipped-in waist." Or the blimp seen from some distance as "one submarine, flying high."

Ever since Pearl Harbor the nation's cartoonists and gagmen have had a field day at the expense of the AAF volunteer ground observers — called "spotters" in some sections. These trusty civilians have taken it on the chin from time to time because they have failed to identify certain test planes flying over their posts. What the wiseacres and critics haven't known was that in months past it was not the responsibility of observers to *recognize* a plane overhead. Their specific orders from the fighter commands instructed them merely to report the number of aircraft, the number of motors, approximate altitude, location from the post and direction of flight: "One bi-motored—high—two miles—SE . . ." and so on.

To most of the many thousands of observers manning the vast network of observation posts flanking our coasts, such designations as P-47, A-20, B-26, L-type and the like were just so much aeronautical jargon.

Mrs. Clemens had "enough to do, heaven knows, with the children and the house, and working for the Red Cross and taking my 'watch' on the OP without learning the difference between a P-39 and a P-40 or whatever they call 'em." Besides she couldn't even tell a Studebaker from a Packard; how could she be expected to tell a Marauder from an Avenger?

So it went—for a whole year. *Every* plane in fighter command areas was reported by a telephone call; every call was plotted on Army filter and operations boards. As the AAF expanded, the number of operational flights increased every week. Aircraft warning information centers became swamped with calls until every filter board looked as if someone had dropped a can of angleworms on it.

There remained but one solution: Eliminate the majority of these "plots" by teaching the ground observers to recognize our ships by type; relieve the congestion on the filter boards by instructing the observers *not* to report specified types.

Teach aircraft recognition to hundreds of thousands of civilians whose time was already taken up with jobs and volunteer war activities? Teach it to people to whom an error in type might mean failure to report an enemy bomber overhead?

"Impossible!" said our coastal fighter commands. So they did it.

NOW, six months later, housewives, school boys, lawyers, stenographers, architects, farmers, plumbers, busy executives —the average cross-section of an American community—can teach some of the Air Force men for whom they work a few things about planes. The AAF has made its ground observers plane-conscious in a big way. Visit any observation post and you'll hear, instead of what Mrs. Proctor told the minister at the Larsons' party the night before, something about a plane with "an inverted gull wing with a negative dihedral" or "four Rolls-Royce in-line motors" or another with "short, stubby motor nacelles, a swept-back leading edge and a fixed tail wheel."

It's no passing fad. These civilian volunteers really know their ships. This one really happened: The commanding general of one of our fighter wings journeyed to a small town to present aircraft recognition diplomas awarded for completion of a five-day course to civilian observer students, most of whom were barely able to distinguish between a fighter and a bomber before they took the course. After the ceremony the general stopped to chat a moment with several observers standing around a table full of plane models of all types. At random the general pointed to a ship, turned to a woman nearby and queried her politely as to the type of ship it was.

"It's the Halifax," she replied without hesitation.

The general smiled, softened his voice as he corrected her, "Don't you mean a Lancaster?"

"No, General," she said with all the assurance of a woman and a civilian, "that's a *Halifax.*"

"I'm sorry," the general persisted, "I'm afraid we'll find it's the Lancaster." They turned it up to read the small printed name underneath. It was the Halifax.

All this has come about since the beginning of the year. Air Force recognition officers, trained at Orlando's AAFSAT or at the 4th Fighter Command headquarters in California, were sent to all filter areas in the fighter wings where they set up recognition schools complete with the latest teaching aids; these included individual sets of flash cards, posters, pictures, slides, projectors, recognition handbooks and everything else an imaginative instructor could dream up. This was the acid test, for it was in these schools they would attempt to teach civil-

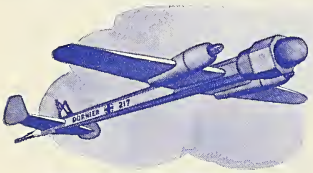
C-46—whale with wings.

ians in *five days* what it had taken them weeks to master.

To the schools come civilian observers —one representative from each observation post in a particular filter area, thirty to forty in a class, a new class each week until all the posts have been covered.

Surprisingly, the majority of the students are men—business men, farmers and professional men, who have had to arrange their affairs to take a week off to attend the Army school. Some, however, are housewives; some are mothers who have left the task of cooking Sonny's breakfast with their husbands while they learn about Focke-Wulfs and Heinkels.

The instructor, usually an officer, and two enlisted men who assist in the enrollment, teaching and motion picture projections, comprise the school's faculty. Classes begin at 0800, sharp. Each Monday morning the officer faces a new group of eager, ambitious observers. "My name is Underwood," he may say. "Our business here is war." And the school is on.



Dornier 217—the flying pencil.

For the next five days and nights these students don't know what hit them. The instructor doesn't pull any punches with these volunteers. He gives it to them straight and fast.

From 0800 to 1800, with a ten-minute break in the forenoon and afternoon and time out for lunch, they get planes, planes and more planes. Fifty-four different ships, more than ten new types a day—fighters, bombers, trainers, transports, Army ships, Navy ships, the enemy's—wing span, trailing edge, horsepower, fin-and-rudder. Dinner, shop talk. Then they have the evening off for play or study. Nobody plays. Most of them go back to the classroom for an informal session, more slides and silhouettes, and a thousand questions to ask the instructor. Later, in their own rooms, they look at flash cards until all the ships become just so many spots before tired, red-rimmed eyes.

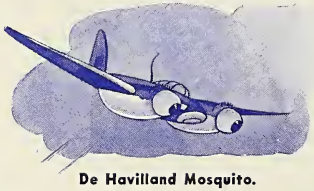
The teaching method used is a modified—or slowed up—form of the Renshaw flash system. If, at the end of the course, these civilians know their planes at 1/10th of a second, it is considered satisfactory. There are no holds barred on the type or number of tricks an instructor may use to make his students learn their planes. The more stories, combat yarns and dramatic episodes he can dig up about the planes in question, the better. Association of ideas is also good. Students remember the Stirling because

British Short Stirling—the flying boxcar.

it resembles a flying boxcar; the Commando, because it looks like a whale. The L-type is a grasshopper, and the Avenger they learn as TBF (two beers free; this is a natural because of the barrel-like fuselage, and the vertical fin and rudder resembling the stein).

If anyone who attends these classes had an idea this week-away-from-home was going to be a picnic, he is quickly disillusioned. For the vast majority of these students this is the first formal classwork they've had since they left high school or college so many years ago they'd rather not talk about it.

The first two or three days are the hardest. Up to Wednesday night, everyone in the class is sure he's going to fail. By Thursday, when the observers are up to their 42nd plane, they begin to see a faint glimmer of daylight. By Friday night, they've made it. They've passed



De Havilland Mosquito.

with flying colors. Saturday morning: graduation. Usually there is an unrehearsed flash-test demonstration for the visiting high-ranking officer who delivers the commencement speech. And finally come the diplomas, signed by the commanding general of the fighter command certifying they have met the AAF requirements in aircraft recognition and are now full-fledged civilian "recognition officers" for their particular post.

Almost without exception there's a party. In exactly one week's time there has developed between these people, regardless of age, creed, profession or nationality, a fraternal feeling that will bind them together for the rest of their lives. No Rotarian ever greeted another with the back-slapping that Fred Meacham from Class One gets when he meets Joe Turner from the same class some six months later.

A fourteen-year-old boy was sent to a recognition class in California to represent his post. In Maine, a 78-year-old woman who walks three miles three times a week to keep her watch on her OP was sent to the school. An Adirondack guide made a seven-mile trip on snowshoes in the dead of winter to get an auto to take him to the train for Syracuse where he attended the initial recognition course there. A woman student in a west coast class received a telegram one morning that her son had been killed in action. She continued her school work. "My son would want me to carry on," she explained.

Whatever they did before they came to the school, however large their bank balances, whichever side of the tracks they live on, the great common denominator is the conviction with all of them that they are part of the Air Forces, that regardless of the cost in time and effort, they are doing something the Army considers necessary to the efficient functioning of the Aircraft Warning Service.

As they leave the school, each brand-new "recognition officer" takes away with him a huge packet of teaching aids: handbooks and flash-cards for every observer on the post. Once home, their *real* work begins: teaching aircraft recognition to every observer on their respective posts, numbering from 50 to 250 students. School is again set up in an available room, schedules are worked out with day and evening classes to accommodate everybody, and the fun begins. Classes are staggered over a four-to-six weeks' period, the objective being to give each observer at least ten hours of actual instruction in recognition.

When all the observers in a filter area have completed this training, the fighter wing is ready to give the new aircraft reporting system the green light.

Does it work? The answer is an unqualified "Yes." Enough time has now elapsed since the initiation of the new

method in many of the fighter wings to evaluate results. They have far exceeded the most optimistic hopes of AWS officers. By instructing the observers in one eastern area, for instance, not to report three clearly recognizable plane types, more than 6,000 calls a day were eliminated from the filter center. The ships on the observers' "negative" lists naturally would vary in different wings according to the preponderance of specific types in the neighborhood of certain aircraft plants and AAF fields. The 1st Fighter Command estimates that more than fifty percent of their "plots" will eventually be eliminated with this system.

When the observer spots an aircraft of the type in question and the ship is sufficiently low and sufficiently close to the post so there is no doubt in his mind that it is a P-47, for instance, he merely "logs" it in his official observation post record, but he does not phone the report. If the plane is too high to be clearly seen, or if he's not yet sure about the type, a report is made to the filter center and the flight is plotted in the usual manner. By this screening process, by greatly reducing the number of flights plotted on obviously friendly planes, the accuracy of the remaining plots (which would naturally include any hostile craft) is proportionately increased.

Teaching aircraft recognition to the AAF Ground Observer Corps is no longer a dream. It has been done. Once again the members of this corps have proved they can take anything the Army can dish out. And like it. ☆

Swing your fifties over these and let go, scoring five for each bulls-eye. One hundred is perfect; ninety, terrific; eighty, good; seventy, fair, and sixty, passing. Any less and you need to brush up on your mental gunnery. Answers on Page 56.

1. *Fifty caliber guns on the P-47 total*

a. Six
b. Eight
c. Five
d. Seven

2. *The present location of the 14th Air Force is*

a. England
b. North Africa
c. China
d. India

3. *The Beaufort scale estimates*

a. Air Speed
b. Wind velocity
c. Altitude
d. Rate of climb

4. *Paramushiro is*

a. One of the Japanese cities bombed by General Doolittle
b. The main Chinese stop on the India-China run
c. A Jap stronghold on the northern tip of the Kurile Islands
d. A key American base in the Aleutians

5. *What is the WEFT system?*

6. *Fill in the missing letters to complete names of AAF planes*

a. Liber———.
b. Must———.
c. Comm———.
d. Mitch———.

7. *The military designation for the DC-4 is*

a. C-87
b. C-54
c. C-78
d. C-47

8. *Which word is out of place in the following grouping?*

a. Chandelle
b. Reversement
c. Immelmann
d. Resonance

9. *Identify this insignia:*

10. *Barksdale Field is located in*

a. Texas
b. California
c. Louisiana
d. Florida

11. *Differentiate between absolute ceiling and service ceiling.*

12. *A williwaw is*

a. A nonrotating device for producing alternating current
b. An electrode having openings through which ions may pass
c. Pigeon English for an airplane
d. A sudden violent gust of cold land air

13. *The approximate range of the B-24 is*

a. 2500 miles
b. 4000 miles
c. 3500 miles
d. 3000 miles

14. *In a one-minute turn, the bank is maintained at*

a. 45 degrees
b. 30 degrees
c. 60 degrees
d. 25 degrees

15. *A parachute pilot is*

a. A pilot who bails out too quickly
b. A small auxiliary parachute
c. A pilot with the Airborne Command
d. A member of the Caterpillar Club

16. *When walking with a civilian, military personnel should always walk to the left.*

a. True
b. False

17. *The MIG-3 is*

a. An American tank
b. An Italian dive bomber
c. A Russian pursuit plane
d. The Navy designation for the A-20

18. *The British Air Marshall is equivalent to what rank in the AAF?*

a. Flight Officer
b. Major General
c. Colonel
d. Lieutenant General

19. *The number of feet in a nautical mile is*

a. 6080.2
b. 5280
c. 5820.6
d. 5000

20. *Identify this plane:*

TRAINING AIDS

MOVIE REVIEW

IF your bomber cracks up in mid-ocean and you and your crew take to life rafts, the man who is worth more than a million dollars to you is a good radio operator. This is the theme of a new training film (TF 1-3310) produced by the AAF First Motion Picture Unit, Culver City, Calif., and billed as "Radio Operator." The film's purpose is to help attach to the radioman the importance he deserves and to orient the student operator to a job that can become the most vital one among members of a bomber crew.

John B. Hughes handles the narration and begins the film with a news broadcast, which dissolves into the story of Recruit Joe Donahue. Highlights of the story are told in the accompanying photos taken from the film strip.

Joe reads the sign **(1)** as he passes through the gates at Scott Field and remarks, "They shouldn't count their operators before they hatch." Still unimpressed, Joe begins his classroom work and one day cuts his finger while tinkering with a life raft radio transmitter **(2)**. A companion tells him to take it easy and learn because someday he might be happy that he can repair such a set.

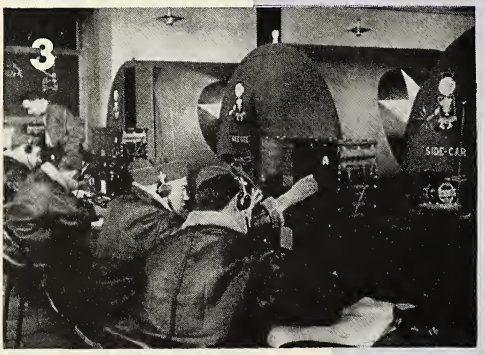
"Keep sending," they tell Joe as he practices for hours on end **(3)**. "Keep sending even when your finger is so numb you can't feel the key. Keep sending until you're sure your message has been received."

Joe feels better when he finally gets assigned to a B-17 and, as the bomber is primed for a take-off, Joe gets busy with his instruments **(4)**. He is nervous and his voice cracks. The tower operator mocking Joe's voice cracks back: "Relax, Donahue, relax." Joe does.

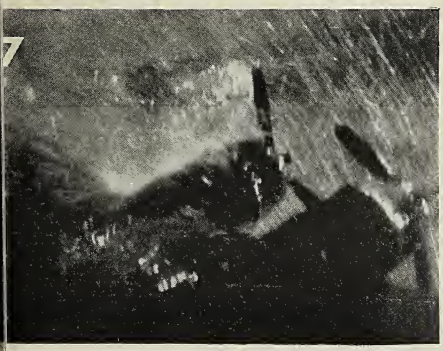
Then come routine flights, one after another, until one day the pilot informs his crew over the interphone that they have taken off under sealed orders and are on their way across. The crew members grin and slap each other on the back **(5)**. That night, out over the ocean, trouble develops. "Fire in number four," the pilot shouts **(6)** and the crew members prepare for a crash landing. Joe notifies all vessels in the vicinity. The bomber hits the sea **(7)** and the crew scrambles for life rafts **(8)** to get away from the sinking plane. Joe has kept his head, brought his life raft radio set with him. He takes the transmitter from its wet, torn case and discovers it's on the blink.

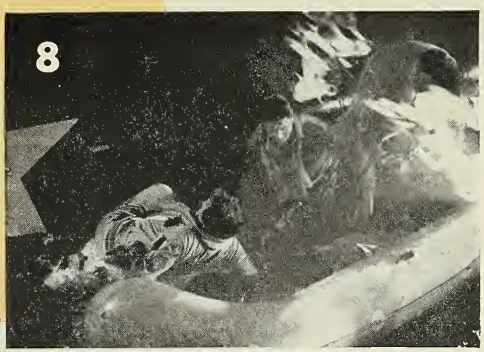
Hour after hour, Joe works with the set **(9)**, and the thirsty, sun-blistered crew members grow short-tempered. Suddenly, Joe cuts his finger on the transmitter, just as he did back in school, and he is reminded of an important adjustment. He works feverishly with the set, finally borrows a companion's shirt to make a kite for the antenna and starts sending.

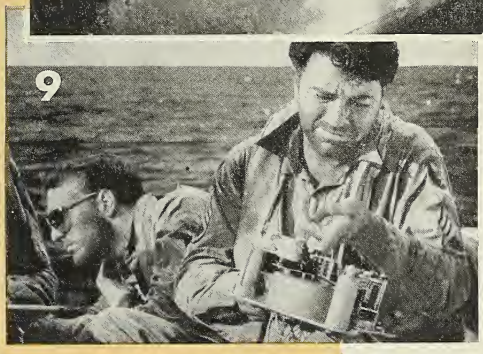
It works. They hear a plane and then after a few anxious moments, they see it heading toward them. The crew members yell and wave **(10)** until they're certain they've been spotted. As the rescue plane comes in for a water-landing **(11)**, Joe kisses his radio. The film ends with a Roll of Honor. On it is the name of Joseph Donahue, radio operator. ☆



RADIO OPERATOR







SYNTHETIC DEVICES

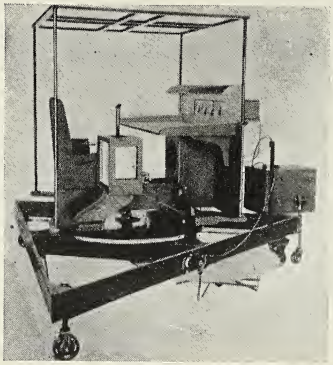
INFORMATION on the availability of synthetic training devices may be obtained from the AAF Training Aids Division, Park Ave. and 32nd St., New York City.

Stereoscopic Viewmaster

THIS device is designed for recognition and range estimation training. It provides stereoscopic views or "three dimensional" pictures of the major friendly and enemy operational aircraft.

Approximately eighty airplanes constitute a set. Each airplane is displayed on a "reel" disc. Seven views of each plane are covered including those from the front, side and 45-degree angles. Six different sky backgrounds are used on the discs, three of sky colors and three of clouds.

Reflector sight rings superimposed on the planes are used for the range estimation. The ranges vary from 100 yards to 600 yards. A typical "reel" is one of the B-17 showing this bomber in various attitudes at ranges of 400, 205, 600, 216, 132, 123, and 136 yards.



Navitrainer

THE Type G-1 Navigation Dead Reckoning Trainer, more commonly known as the "Navitrainer," is a compact device supported on a triangular moving base. Problems in dead reckoning navigation may be simulated and the results recorded.

The Navitrainer is composed of three main assemblies: the navigator's car, triangular frame and the windtroducer. The navigator's car contains the plotting table, drift meter, compass and other flight instruments. The car is totally enclosed by a canopy and is mounted on the frame, which moves in any direction and travels at a speed proportionate to the air speed of the simulated airplane. The windtroducer serves two functions. It introduces wind direction and velocity, and it supports a chart or map that is used as a reference for determining the simulated airplane's position or course of travel.

An instructor, who exercises supervision through an externally located instrument control box, can introduce drift and control the readings on the other instruments.

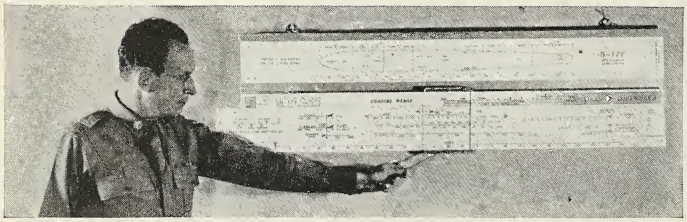
This equipment operates from a standard AC light outlet.

Giant Load Adjustor

THIS training aid is a large, exact reproduction of the slide rule type of load adjustor used for determining quickly and accurately the proper loading of a combat or cargo airplane for safe and efficient balance during flight.

Load adjustors and the giant mock-ups are made for specific plane types and models where loading situations of crew members, fuel oil and cargo must be quickly computed for center of gravity determination.

The Giant Load Adjustor is used for demonstration and instruction in classrooms. This device is ASC issue.



What They're Reading

HERE'S LOOKING AT 'EM

THE long-awaited pictorial recognition manual (FM 30-30) is out. A joint Army-Navy publication, it is made up in loose-leaf form so that as new planes come into service pages can be prepared and inserted and as planes become obsolete existing pages can be removed without revising the entire publication.

In its present form, the manual describes some eighty operational aircraft—American Army and Navy, British, German, Japanese and Italian. One page is devoted to each plane, and each page contains recognition and performance data condensed into short paragraphs, head-on, side and top drawings and silhouettes, and four aerial photographs.

In addition, the introduction includes sections on aids and methods for recognition training, names and letter designations of various planes, a glossary of terms and a set of scaled plane silhouettes which show at a glance comparative sizes of different aircraft.

RECOGNITION TRAINING

"INSTRUCTIONS for the AAF Method of Recognition Training" is exactly what its title implies—instructions for teaching recognition of planes, vehicles, and ships, and for employing the equipment on which successful teaching by that system depends.

It is planned to include a copy of the pamphlet with each set of equipment, primarily for the benefit of those using the equipment for instructional purposes. The pamphlet, however, gives enough of the idea behind the method to be of interest to anyone concerned with the problem of successful recognition instruction.

The pamphlet also includes plans for a simple flash shutter which can be made at any post or station.

Stuttgart, Arkansas
Squadron 25, S.A.B.

Editor
AIR FORCE Editorial Office
New York, N. Y.

Dear Sir:

I am now enlisted in the Army Air Forces as a glider pilot trainee. Before entering the Army I was employed as a laundry executive, having spent two years at the Ohio Mechanics Institute studying the laundry business.

Since I have been in the Army, I have found that there is no laundry service on many posts or the laundry service offered is inadequate to meet the needs of the men. As a result, many men attempt to wash their own clothes. They have no knowledge of how the job should be done and usually either ruin the clothes or end up with them as dirty as when they started. Many of these men give up after two or three attempts and throw underwear and socks away when they become too dirty to wear. I have seen this happen so many times that it occurs to me that there must be a tremendous waste of clothing throughout the armed forces plus a lot of men who would be healthier and much more comfortable if they knew how to launder their clothes properly.

Sincerely yours,
(signed) Staff Sgt. Arthur H. Brown

HOW TO WASH YOUR CLOTHES

By Staff Sgt. Arthur H. Brown

SERVICEMEN are all apt to find themselves stationed, sometime or another, at a post that never heard of a laundry. Although we moan and groan there is no way to get our clothes cleaned except to wash them ourselves. We postpone the job as long as possible but, finally, we get down to that last clean pair of shorts and something must be done.

Washing your own clothes is not nearly so disagreeable as you might imagine, especially if you have some knowledge of how to go at it. There is a definite satisfaction in turning out a good clean job.

Let's suppose that we have the one pair of shorts left and have decided to wash all the dirty clothes we have stored up. Carrying them to the washroom, we hope there is hot water available, for it will make the work much easier. Cold water will do, but a little more elbow grease will be required to shake the dirt loose.

Before washing the clothes, we separate them into different groups. Colored materials should never be washed with white because the colors often run. Also, never wash very dirty clothes with those that are only slightly soiled. The dirt will be transferred to the cleaner pieces.

The easiest and safest method of doing clothes is to wash each type of garment separately. In other words, wash all underwear together, all colored socks together, all white socks together, all handkerchiefs together and so on.

Use the washtub if there is one available, otherwise use two wash bowls. A large cake of GI soap will be needed. However, a package of granulated soap (one that is recommended for home washing machines) will make the job easier because it will dissolve more readily in the water.

Fill the tub or bowl with enough water to cover the clothes to a depth of two or three inches. The water should be slightly hotter than lukewarm and should be prepared before the clothes are put in, so that any garments containing wool will not be shrunk by getting under the hot water faucet.

After the clothes have been put into the water add enough soap to keep at least half an inch of suds on top of the water at all times. This is very important because the soap has two functions: the first is to loosen the dirt from the clothes; the second is to keep that dirt suspended until clothes are removed. As soon as that layer of soapsuds disappears from the top of the wash-water, the dirt begins to settle back into the garments.

This dirt, however, is held by a layer of lime soap. (Lime soap is the same sticky substance that made the ring around the old bathtub.) Most of the poor laundry work turned out in camps, especially that with a brownish tint or black greasy specks, is the result of having insufficient soap *dissolved* in the water.

If a washboard is not available, scrub your clothes by rubbing them between the hands. A scrub brush can be used on very dirty pieces but it is not recommended for most work. Two suds and three rinses are the minimum for a good clean washing.

If you are using two washbasins, you can have a batch of clothes soaking in one while you work in the other. There is, however, no benefit derived from soaking clothes more than fifteen minutes.

The clean clothes should be wrung out and hung to dry. Squeeze water gently from all garments containing wool because wringing will damage the fabric. Sunlight has a sterilizing and bleaching action, so your clothes will be whiter and purer if they are dried outside.

If you find handkerchiefs hard to get clean and slightly slippery, soak them in salt water for an hour before washing.

Now let us summarize the "Do's" and "Don'ts" of this washing business and you can go to work.

1. Separate your laundry into the various types of garments before washing, being sure never to wash colored work with white.
2. Mix each basin of water before putting in the clothes.
3. Maintain at least half an inch of soapsuds on top of the water during each sudsing operation.
4. Dry garments in the sun whenever possible.
5. Don't attempt to wash clothes under running water, such as in basins without stoppers or under showers, because for good washing it is necessary to build up a concentration of soap in the water itself and this is impossible when fresh water is constantly being added. ☆

"To service combat units of the Army Air Forces at all times and under any conditions, regardless of the difficulties encountered"

THE ROLE OF THE SUB-DEPOT

By Lieut. Col. Arthur V. Jones, Jr.

COMMANDING OFFICER, 29TH SUB-DEPOT,
ENID ARMY FLYING SCHOOL, OKLAHOMA

THE slogan "keep 'em flying" has become a familiar sight and sound to Americans. Everywhere it is seen on banners and posters. It is heard as a radio greeting and sign-off. It has become a conversational by-word.

Let us examine the conditions that lie behind that short phrase. First and foremost is the apparent fact that superior air power makes possible a greater offensive power in this war. Air power, then, is a major factor in tactical planning.

The planning staff must first have a source of adequate supply of aircraft and parts. The second necessity is a system for the storage and issuing of these supplies, and for the maintenance, repair and reclamation of these aircraft.

The first problem is met by industrial expansion throughout the United Nations. The second is the function of the Air Service Command of the Army Air Forces.

The Air Service Command controls, handles and distributes all Air Forces property throughout the world. It also conducts repair, maintenance and reclamation of all U. S. military aircraft.

In the continental United States, these activities are coordinated through eleven control area commands and control depots, and then through the lowest domestic ASC echelon, the sub-depot.

SERVING every Army airbase and flying training school is an Air Service Command sub-depot. Command is vested in an Air Service officer who is responsible to the station commander (on other than Air Service Command stations) in matters of post administration only.

In addition to his technical knowledge of the activities of his sub-depot, the thorough CO keeps a finger on the personnel pulse of his organization.

The fundamental precept of personnel management — knowing one's employees —was never more true than in the sub-depot set-up.

It is of utmost importance that the commanding officer "get around" the shops, the warehouse and the hangars and keep in close touch with his people.

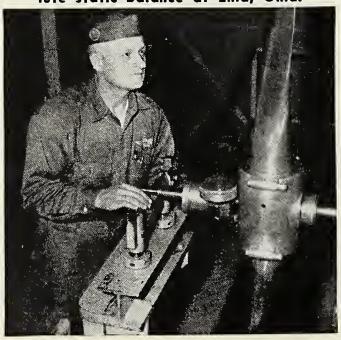
The sub-depot that is run entirely from the cushioned chair in the commanding officer's headquarters office cannot be the alert, vigorous organization it should be.

Nearly all domestic sub-depots are operated by civilian personnel administered by officers of the Army Air Forces. A sub-depot at a training base, such as the Enid Army Flying School, will employ several hundred civilian employees and be staffed by a small corps of officers. (Of course, very few civilians are used in combat areas.)

The sub-depot exists for one purpose. That purpose, briefly stated, is to do everything within its power to keep the aircraft flying and in combat fitness.

The aggressive sub-depot commander will place his services at the disposal of the flying organizations of the station 24 hours a day and seven days a week. He should make certain that the sub-depot is never called upon at any time of the day or night that it cannot perform the service required. To accomplish this end the sub-depot commander has three major departments; supply, maintenance and signal.

Clyde Smith tests a prop for absolute static balance at Enid, Okla.



The maintenance department is organized and equipped to perform all second echelon airplane maintenance and as much of third as lies within its space and equipment limitations.

IT can perform major repair of aircraft and any assembly thereof, except engines. It operates extensive shops for all types of wood, metal, plastic, leather and cloth manufacture and repair. It operates the parachute unit and performs all second echelon inspection and maintenance.

The maintenance officer is the final authority on the base in regard to technical matters pertaining to aircraft. He maintains a technical order compliance system and aids the station technical inspector and organization engineering officers in their efforts. It is his duty to take the objective view and offer aid to any organization, whether or not the problem is brought to him.

By a consolidation of daily aircraft status reports he is able to keep close check on all station aircraft.

In most every case there is no ordnance officer on the sub-depot staff. Ordnance requirements and servicing are handled by the air force or the command which operates the airbase or airfield on which the sub-depot is located. This differs from overseas operations wherein the air depot group, or mobile miniature of a control depot, has an ordnance section attached to its headquarters and headquarters squadron. Also in overseas operations, the air service group, or mobile miniature of a sub-depot, gets its ordnance servicing and requirements from its own supply and maintenance squadron, which includes ordnance specialists.

The sub-depot is responsible for furnishing the station all supplies and equipment peculiar to the Air Forces,

(The motto appearing at the top of this page is that of the 59th Sub-Depot, Lowry Field, Colo.)

maintaining an adequate replacement stock and expediting the shipping and receiving of more than 15,000 items.

It is the duty of the supply officer to anticipate demands upon his stock resulting from changes in aircraft types assigned to the station, from seasonal changes, from operating conditions and from normal rates of consumption.

He has funds which are available for the local purchase of necessary supplies that are not available through normal supply channels.

John E. Wright, blacksmithing for the 20th Sub-Depot, Coffeyville, Kan.

The signal sub-section, whose parent unit is the control depot signal section, is responsible for the storage and issuing of all items of Signal Corps equipment used by the Air Forces and assigned troops. It installs and maintains all ground radar and fixed ground communication equipment, performs all necessary service and maintenance of airborne radio, radar and navigation equipment used by the Air Forces. This section supplies replacement sets and maintenance parts for such equipment.

In technical matters pertaining to the installation of signal equipment in airplanes the signal officer is responsible to the maintenance officer. In administrative matters he is, as are all department heads, responsible directly to the sub-depot commander.

If the sub-depot is to function at utmost efficiency, the officers heading each department should be able to look beyond their own units and understand the problems confronting their fellow workers.

To accomplish this end a plan was effected at the 29th Sub-Depot which is saving hundreds of man-hours each week by placing vital supplies at the place they are needed most at the time they are needed, on the flying line and in the shops. The system entails the services of a liaison man who is well informed on maintenance supply problems.

Functioning as a trouble-shooter, the supply coordinator receives all not-in-stock requisitions as they are returned to the maintenance department. It is his duty to ascertain whether or not an error has been made in the nomenclature or stock number. If the requisitioned merchandise is truly not in stock, he notifies the foreman who placed the order as to when he may expect the merchandise.

After receiving this information, foremen often find it advisable to make substitutions rather than hold up production.

Before this system was instituted every foreman was responsible for the follow-through on his orders. This resulted in much time lost both for the supply department because of frequent interruptions and for the foremen who were forced to be away from their departments to check on undelivered merchandise.

A major and vitally important function of the sub-depot is the training department. A course in foremanship is attended by all supervisory employees. Lectures in safety practices and first aid are a requirement for all employees. Up-grading is fast in these days of dwindling manpower and a progressive educational system is vital.

The training supervisor, a civilian with a background of teaching administration and organization, maintains a reading room and library of technical books, obtains training films and coordinates with local off-the-post schools, and state and national organizations featuring adult vocational education programs.

The sub-depot safety engineer functions largely as a technical advisor to foremen and top management. He is also qualified to recognize the existence of health hazards. He studies causes of absenteeism, keeps records and makes reports on all injuries.

At the 29th Sub-Depot, daily inspections are made by the safety engineer during which safety suggestions are gathered from foremen and employees. At the end of each month a detailed report is made to the commanding officer. Safety hazards, suggestions for corrective action, accident classifications and frequency and severity statistics are included in his report.

THE aggressive action of the 29th Sub-Depot safety engineer has resulted in the enrollment and subsequent training of forty 29th Sub-Depot employees in a special safety training course sponsored by the War Manpower Commission and presented as a 96-hour night school course by the state university.

Chief among the unsung heroes of any organization are such behind-the-scenes men as janitors, building repair men, equipment alterers, carpenters and freight handlers.

At most sub-depots this work is done through the station engineers. In order that these tasks may be accomplished with greater speed, a utilities and plant maintenance department has been created at the 29th Sub-Depot.

Headed by a utilities supervisor, the personnel of this department form a labor pool which is capable of performing almost any task with the greatest economy of time. He may also "borrow" skilled and technical assistants from other departments.

This department works closely with the station utilities department for in many instances repairs and alterations cannot be made until permission is granted from the station engineer or commander. ☆

WHAT'S WRONG WITH THIS PICTURE?

RALLY around, men, for another session of uncovering boners.

We all know there's a right way and a wrong way of doing everything but these mechs are jacking a plane the hard way. They might just as well have begun correctly and followed through, for valuable time is wasted by starting incorrectly and then backtracking to patch up mistakes.

The men who posed this job in the blundering way are Cpl. Henry Dickens on the wing and (left to right) Pvt. Andrew Gilstein, Sgt. Clarence Schwake and Tech. Sgt. Chas. A. Petrou, all attached to Headquarters Squadron, ASC.

Sergeant Petrou can find eight mistakes in the picture. These are listed on Page 48. Do you see any that he missed?

ON THE LINE

A monthly maintenance roundup prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

If You Don't Know How, Learn How . . .

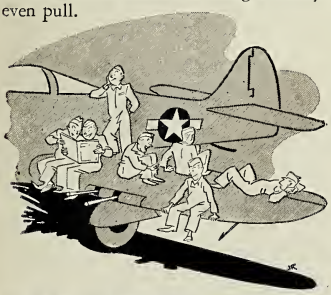
Frequently you stand watching an airplane take off into the skies. You've done this lots of times, haven't you? Now and then something of your own spirit soars with the craft as your eyes follow it away. You ought to feel pretty proud because you helped get that plane aloft. It's going on its mission in fine fettle, properly serviced. You did a good job.

When you didn't know how to tighten a hose clamp to the proper tension, you were smart enough not to do it until you learned the right way. Experienced mechs in each squadron are always ready to answer questions for new crew members. *Do it right or don't do it at all.* Don't slip up on the slightest detail. If in doubt, consult the proper TO. When you work on an airplane, give it your best. Mistakes that jeopardize the safety of pilot and crew are unpardonable.

These are the words of an AAF captain, still young after fifteen years as an enlisted man, who looks back with pride to the work he did ON THE LINE because he feels confident it was done the right way.

Don't Be A Jerk . . .

Using a straight wrench, when an offset wrench is called for, to get on the nut squarely results in "rounding" the nut, barking your knuckles and wasting more time generally than would have been required by procuring the proper tool right off the bat. Incidentally the threads on a bolt or nut are stripped easily by jerking on the wrench instead of using a steady, even pull.



Sit under the apple tree,
If you will, but not on plane wings.
Men or obstacles shouldn't be up there.

Paint Shop . . .

Just a reminder that your paint shop should be well ventilated at all times. It is a likely place for a fire to start. Essential fire-fighting equipment in necessary quantity must be ready at all times.

Repeatedly you are cautioned against spraying paint in a closed hangar. Just to keep this grave hazard firmly in mind, refer to TO 07-1-4.

Take It Off . . .

Before each flight take a look at the exposed pistons of pneumatic shock struts on landing, tail and nose gear. They must be cleaned of ice, mud, dust or sand to cut down excessive wear on the strut and packings. Use a cloth saturated with alcohol as emphasized in TO 03-25-6.

Shielded Bearings . . .

It is said that metal shielded anti-friction bearings with fixed seals are being oiled in some instances. TO No. 29-1-3 states that grease (specification AN-G-3) shall be used as the lubricant. The original grease is the only grease for the life of the bearing. Oil washes away the essential grease, exposes bearings to dust and grit. To say the least, this doesn't do the bearings any good.

Think This Over . . .

Some planes fly week in and week out and never get a major write-up from the pilot. There must be a reason. And the reason is that they are serviced by you mechs who really know proper maintenance procedure.

Here You Have It . . .

Mechs, we have but one job—to see that our pilots fly the safest possible airplanes.

Put 'Em Back . . .

When tools are removed from a plane's special kit it is impossible to maintain the craft properly while on flights away from its home base. Reference: TO 18-1-26.

Slipping on Slippage Marks . . .

Painting the prescribed slippage marks on tires makes inspection much easier. Also, failure to inspect tires for slippage will end up in the valve stem pulling out, causing tire and tube failure. Reference: TO 04-1-11.

Fuel Leaks . . .

Fire, either in the air or on the ground, can start almost immediately from fuel leaks around the carburetor and primer system. Many such leaks are found, indicating that fuel systems are not being checked under pressure. Check fuel systems under pressure at the 25-hour inspection, according to the Airplane Handbook of Service Instructions.

Fire Extinguishers . . .

Do you have a date tag on all one-quart type fire extinguishers as stipulated in TO 03-45-1? Also, TO 16-20-1, paragraph 8-d directs that contents of CO_2 extinguishers should be stenciled on the cylinders in letters approximately an inch high. And, TO 16-20-2 states that the date it is placed in use be marked in three-quarter inch letters. Paragraph Six requires that an extinguisher be inspected every six months and date of inspection lettered on the cylinder.

Check WD Circular 261, 1942. A thorough and frequent system of inspection for contents of fire extinguishers will be instituted by post, camp and station COs to see they are filled with the proper fire extinguisher fluid and *not* with inflammable liquids. This is in addition to other inspections. ☆

Get a reading lamp, Buddy!
Or those wing lights may fail when needed for a landing. See TO 01-1-61.

them between his hands. Then they take you to their plane, less than 200 yards away, and you head back to the Ephrata hospital and airbase. The hand is treated with sulfadizine ointment and bandaged. It didn't take long. The parachute drop was 23 minutes, 51 seconds, almost exactly what had been figured out theoretically before by personnel in the physics branch of aero-medical laboratory.

AND that was the jump I made on June 24. What I learned and what I would like to pass on to airmen who may be making a jump from such a height is theory no longer. I know, and the Air Surgeon's Office knows, for it received the complete account of the jump first hand as soon as it was possible for me to make a full report to Brig. Gen. David N. W. Grant, the Air Surgeon.

Here is what I learned.

Be sure to have bail-out oxygen equipment on all flights above 30,000 feet. When the parachute jerks open, the sudden compression of the chest by the parachute harness forces all oxygen from the lungs. To start breathing again, you will need all of the oxygen you can get to refill your lungs. The bail-out bottle will take care of you.

In a large plane, a bail-out bottle is extremely necessary for without it you easily could lose consciousness before reaching the emergency exit of the plane.

To ease the shock of the parachute opening, you should fall free of the plane until your forward momentum is lost. This will lessen the jolt when the parachute checks your fall and you more likely will be able to retain consciousness.

The importance of retaining consciousness was emphasized ten days after I had made my carefully planned jump. One of Wright Field's test pilots was forced to bail out at 32,000 feet when the plane he was testing had a structural failure. The pilot did not have bail-out oxygen equipment so, before leaving the plane, he inhaled three deep breaths of oxygen. Then, holding his nose, he jumped out. After tumbling for 2,000 feet he began to feel fuzzy so he pulled the rip-cord and then lost consciousness as the parachute snapped open.

The pilot fully regained consciousness at 10,000 feet but was so weak from lack of oxygen that he could not control parachute oscillations or his landing, which resulted in back injuries.

With adequate oxygen, I was able to retain my strength and revive more quickly from the unconscious period following the opening of the chute. Thus, I was able to handle myself upon landing.

For those of you who may not know, pure oxygen should be given to any person who has been exposed to a lack of oxygen. This should be given to the patient until his color returns to normal.

In the event of frost-bite of your hands, put them between your legs or under your arms or against any warm part of the body—*but don't rub them.*

In addition to these observations, I satisfied myself that the GI bail-out bottle contains adequate oxygen for jumps over 40,000 feet and that the oxygen equipment with which we have been working for the last five years will operate under extreme cold and low pressure conditions.

Preparation for this flight and jump was very detailed. While at Wright Field, I followed a simulated flight and parachute descent pattern in the pressure chambers of the aero-medical laboratory. On another flight, preceding the jump, a dummy was dropped on a parachute to ascertain the number of minutes the descent could be expected to take.

I had made three previous flights well over 40,000 feet—one piggy-back in a P-38. From these I found it to be easier to fly at high altitudes than to simulate such flights in a pressure chamber.

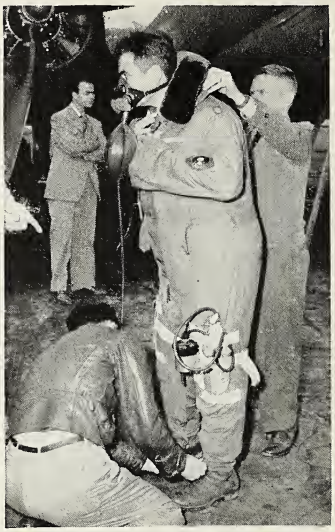
In the aero-medical laboratory at Wright Field, Lieut. K. E. Penrod conducted extensive physiological tests through simulated parachute jumps from various altitudes to ascertain what conditions I would have to withstand. Capt. Perry Thomas was largely responsible for the research and development of the mechanical equipment, including the cylinder and the means of metering the oxygen, which was a modification of the RAF system.

Colonel Lovelace began his oxygen research work in the Mayo Clinic in 1938. He previously had been graduated from the Randolph Field School of Aviation Medicine as a flight surgeon. Other medical education was obtained at Washington University in St. Louis, Harvard University, and University of Minnesota, from which he received the degree Master of Surgery. He now is president of the Aero-Medical Association of the United States.

As a civilian at the Mayo Clinic, Colonel Lovelace had a part in the development of the first practical production model oxygen mask—the BLB, from the initials of Doctors Boothby, Lovelace and Bulbulian. For this and other original oxygen research work by Mayo clinic scientists with Col. Harry G. Armstrong (former director of the Wright Field aero-medical laboratory), and the airlines, the Collier trophy was awarded in 1940, and Colonel Lovelace was one of those privileged to receive it from President Roosevelt. ☆

Bailing Out at 40,000 Feet

(Continued from Page 25)



Colonel Lovelace has his equipment adjusted by members of the Boeing flight test department.

MISTAKES IN "ON THE LINE" PICTURE ON PAGE 46

(Reading from left to right)

1. The belly landing made by the mech on the wing was an unnecessary emergency. Men and materials should not be on the wings during jacking. To loosen Dzus fasteners use a shorter screw driver and stand on a crew chief's stand. Pressure is needed, not just a twist of the wrist.

2. Somebody's going to kick the bucket—the one under the prop, to be specific. Such irrelevant objects cause sprained ankles and broken necks.

3. You wouldn't have to scrunch under the nacelle, Sergeant, if that jack were in position. Where you are now, one move and you'll bump your noggin against the cowl flap. The hydraulic pump should be on the foremost leg *away* from the plane.

4. Say, you standing behind the jack, take your right foot off the hose made of that rare substance, rubber, ere you ruin it. See TO 04-5-2.

5. No need to page Sherlock Holmes on this one—there's grease on the floor! Only a little bit, to be sure, but you might discover it too late to avoid an accident.

6. It looks as if that jack ram is not properly aligned under the jack pad. One slip and you'll ruin the wing. The jacking cone being used isn't the proper one for the jacking pad. A cone adapter is on instead of a spherical adapter which should be used. Reference: TO 19-1-18.

7. Bad business, putting that wooden block under the leg of the jack. Can't you see you're throwing the whole works off balance? Move the jack into proper position and don't attempt to doctor a wrong set-up by raising one leg.

8. And now, an old saying that can be followed advantageously ON THE LINE is: "A place for everything and everything in its place." In this instance it applies to the oily rags and scrap rubber receptacles on the cart, which obviously have nothing to do with jacking a plane. Keep your working areas clear of clutter.

CARIBBEAN BASE OPERATIONS

by Lieut. Wm. T. Lent

An orchid to the earth-bound operations officer. Tied to his desk by administrative responsibilities, he manages to thrive on worry and live for the day when he may spread his wings again and soar into the clouds of combat.

Even the "brass hats" are human in the AAF. Colonel Brown is needling Colonel Larkin about piloting their B-17 into a bumpy landing. Their conversation is amusing to the fledgling fighter pilots in the background who just caught hell from the CO for buzzing the field.

The forecaster is being very cagey about divulging secret weather information to the pilot who chooses to be likewise cautious about his specific destination. This kind of thing is likely to result in a temporary stalemate. They'll get together over a coke and a cigarette, however, and the pilot will be on his way, shaking his head over the forecaster's psychic power (or lack thereof).

The distraught dispatcher has his problems too. Through the din of teletype machines and the inter-com phone he manages to break the hourly bottleneck of air traffic. At the moment the line chief is checking with him on a missing parachute while an overdue pilot standing behind him is sweating out his clearance.

The crash truck boys are members of the alert crew. As a plane comes in for a landing they'll start the motor and, with pardonable pride in their profession, secretly hope for a "nose-over."

ATC Pilot Betts has just landed his transport and is offering a PX hot dog to passenger Clarence Calkins, civilian engineer. Having completed his first and probably last flight down the usually stormy coastline, Clarence will take the slow boat back to the States after completing his job at the base. Just now the hot dog is a bit revolting to Clarence.

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

Roll of Honor

MEDAL OF HONOR

LIEUTENANT Jack W. Mathis*. **STAFF SERGEANT** Maynard H. Smith.

DISTINGUISHED SERVICE CROSS

LIEUTENANT COLONEL Chesley G. Peterson. **LIEUTENANTS:** John J. Howell*, Harold L. Pederson*.

DISTINGUISHED SERVICE MEDAL

LIEUTENANT GENERAL Carl Spaatz. **BRIGADIER GENERAL** Hoyt S. Vandenberg. **STAFF SERGEANT** Frank W. Bartlett (Also Distinguished Flying Cross).

LEGION OF MERIT

COLONELS: Bartlett Beaman, Julian M. Joplin. **LIEUTENANT COLONELS:** Leighton I. Davis, Bradley J. Gaylord, Horace H. Manchester*. **MAJOR** David M. Van Ornum. **LIEUTENANTS:** William F. Haizlip, Rocco Sansone. **MASTER SERGEANT** George W. Mitchell.

SILVER STAR

BRIGADIER GENERAL Fred L. Anderson, Jr. **COLONEL** John E. Barr. **LIEUTENANT COLONELS:** John R. Alison (Also Purple Heart and Distinguished Flying Cross). **CAPTAINS:** Everett W. Holstrom, Mario F. Sesso. **LIEUTENANTS:** Bryan W. Brown, Zed D. Fountain, Vernon L. Head, Hazen D. Helvey, John E. L. Huse*, Elwin H. Jackson, Ralph C. Johnston, Walter E. Lacy*. **TECHNICAL SERGEANTS:** Clinton P. Merrell, Arvle D. Sirmans. **STAFF SERGEANTS:** Sam J. McGlaughlin, Jr., John D. Zealor. **SERGEANT** William P. Laplant. **CORPORALS** Riley J. Bryan, Jack W. Newton. **PRIVATE FIRST CLASS** Thomas S. Bartlett. **PRIVATES:** Donald A. Ward, Edward T. White.

OAK LEAF CLUSTER TO SILVER STAR

LIEUTENANT Jack I. B. Donaldson.

PURPLE HEART

MAJORS: Frederick Delaney, Jr. (Also Air Medal), John D. Lombard (Also Distinguished Flying Cross with Oak Leaf Cluster and two Oak Leaf Clusters to Silver Star), Charles W. Marsalek*. **LIEUTENANTS:** Irwin Foster, Thomas Frederick Lohr. **FIRST SERGEANT** Chancy M. Hills. **TECHNICAL SERGEANTS:** Leonard M. Fox, Jennings H. Palmer (Also Distinguished Flying Cross and Air Medal with 3 Oak Leaf Clusters). **STAFF SERGEANTS:** Edwin M. Breedlove, Anthony B. Cumm, John T. De John (Also Air Medal), Nathan R. Gelber*, Eber J. Neely, Robert D. Pannier, Stanley Poplaski. **SERGEANTS:** Hyman Bernstein, Nelson P. Reed. **CORPORALS:** Raymond H. Alsip, Clarence M. Hoehn, Marcellus B. Olmsted, James D. Robinson, Lonnie D. Wright. **PRIVATES FIRST CLASS:** James A. Horner*, John T. Haughey*, Marion H. Zaczkiewicz*. **PRIVATES:** Jack A. Downs*, Harry W. Lord*, Ruby Prater, William S. Riley, Merton I. Staples*, Walter D. Zuckoff*.

* Posthumous

DISTINGUISHED FLYING CROSS

LIEUTENANT COLONEL Frank Dunn. **MAJOR** Dill B. Ellis (Also Air Medal). **CAPTAINS:** Curtis B. Caton*, Frank C. Church. **LIEUTENANTS:** John L. Cronkhite (Also Air Medal), Fred G. Henry, Hulet C. Hornbeck (Also Air Medal), William W. Martin, Stephen Poleschuk (Also Air Medal), Robert L. Ramsay, Jr. (Also Oak Leaf Cluster to Silver Star), Walter T. Schmid (Also Air Medal). **FLIGHT OFFICERS:** George M. Pearce, William H. Rogers. **MASTER SERGEANT** Norman L. Biehn. **TECHNICAL SERGEANTS:** Edwin R. Isaac, Mahlon E. Leed, Wallace E. Odneal. **STAFF SERGEANTS:** Forrest M. Adams, Henry F. Arts, Jr., Jesse D. Bergquist, Fred M. Clark, Guy W. Clary, John D. Cox, Gillman W. Gilbertson, Walter W. Keck, Lloyd J. Mahan, Leroy M. Norgan, Coleman A. Robinson, Kenneth G. Wagoner. **SERGEANTS:** Rex A. Applegate, Robert J. Gaines, Robert W. Mader, Charles P. Pamrowski, Wallace E. Smith (Also Air Medal). **CORPORALS:** George H. Behrens, Frank L. Bonito, Carl H. Firchau, Owen H. Golden, Walter R. Green, Ferdinand Milisci, Dennis Murray, Marvin D. Swenson. **PRIVATES FIRST CLASS:** Gerlad J. Bogacki, Charles L. Coury, Jacob J. Deyarmond, John P. Hawley, Marcellius Lampe, Louie E. Philpot. **PRIVATES:** Cyril H. Arnzen, Dell C. Drawdy, Joe S. Gallagher, Conrad H. Kopperud, William G. Latteman, Carl L. Milberger, Gilbert L. Runnels, Royce L. Shepherd, John M. Swenson. **FORMER AVG MEMBER** John E. Petach, Jr.

OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

MAJOR Albert J. Baumler. **CAPTAIN** Thomas J. Lynch. **LIEUTENANT** Anthony C. Yenalavage.

SOLDIER'S MEDAL

TECHNICAL SERGEANT James D. Warrington. **SERGEANT** Floyd R. Hudgens. **TECHNICIAN FOURTH GRADE** Frank A. Derosa. **CORPORAL** Charles H. Reynolds.

OAK LEAF CLUSTER TO SOLDIER'S MEDAL

MASTER SERGEANT Joseph D. Healy. **SERGEANT** Hendrik Dolleman.

AIR MEDAL

COLONEL Cecil E. Combs. **LIEUTENANT COLONEL** George E. Schaetzel. **MAJOR** Harley C. Vaughn (With Oak Leaf Cluster). **CAPTAINS:** Charles N. Bannerman, John F. Barrett, John E. Bartlett, Clayton J. Campbell, Clement V. Charbonneau, Charles J. Hoey, Robert E. Kimmel, Henry P. King, John L. Lambert (With Oak Leaf Cluster), Richard W. La Roque, Harold J. Larson, John Carter Legg, III, Kenneth L. Lueke, Irving Paul MacTaggart, Henry M. McAleenan, Samuel B. McGowan, Laidler B. Mackall, Frank Leslie Martine, John W. Miller, Mitchell J. B. Mulholland, William E. Mullin, Albert Nowak, Elmer L. Parsel*,

Thomas E. Peddy, Paul M. Person, Maurice V. Salada, Harold D. Schmoldt, John H. Shaw, Pete C. Sianis, Donald A. Simpson, Glenn W. Sorensen, Edward F. Stoddard (With Oak Leaf Cluster), Howard K. Teague, Arthur H. Tuttle, Jr., Sachse Wallace, Cyrus A. Whittington, Cloyd Woolley. **LIEUTENANTS:** Robert J. Art, Paul R. Badger, Bernard L. Barber, James R. Barbour, Carl H. Barton, Charles R. Cook, Walter H. Coons, R. S. Couture (With Oak Leaf Cluster), Gerard J. Creamer, Charles W. Crisler, Jr., William S. J. Curley (With Oak Leaf Cluster), Charles Clifton Cutforth, Lawrence J. Daly, Jr., Edward L. Daniels, John D. Davenport, Thomas C. Day, Clyde E. DeBaun (With Oak Leaf Cluster), Julian A. Dickey (With Oak Leaf Cluster), John M. Diffley, Stephen P. Dillon, Joseph F. Disalvo, Jacob Wylie Dixon (With Oak Leaf Cluster), Anthony Donabedian, John R. Downswell, Cecil C. Duncan, Edgar H. Dunn, Jr., Harold E. Dyment, Eugene B. Ellis, Sherman E. Ellis, William J. Emerson, John W. Emmons, Thomas W. Ferebee, Paul Griffith Ferstle, Rocco A. Franchi, Howard W. Fraser, John H. Frick (With Oak Leaf Cluster), Joseph Ernest Fuszek, Charles F. Gallmeier, John A. Gallup, Kenneth Gaynor, Victor J. Giles, Joe D. Gillon, Jr., Otto Goldsteinn, Theodore H. Gorton, Robert L. Gould, Eugene E. Greeson, Silas M. Grider, James A. Grigsby, James M. Hair, Dan G. Hann, Clarence L. Harmon, Ralph Daniel Harrison, Everett E. Haskell, Jr., William D. Hector, George G. Hedblom (With Oak Leaf Cluster), William J. Heldt, Delbert R. Hetrick, Alvin J. Hill, Morey L. Hodgman, Kenneth W. Holbert, Gaylord D. Holmes, John J. Hood, A. T. House, Jr., Carl H. Houseworth, William T. Humphries, Jr., William Hunter, John H. Ijams, Jr.*, Joseph R. Irvin, William G. Ivey, Harold M. Jaffe, Frederick R. Jenks, Wayne S. Johnson, John C. Johnston*, Joseph P. Johnston, Garret J. Jones, Jack Jones*, Randall L. Jones, George W. Jordan, Duncan G. Kaye, Albert W. Kellams, Eugene E. Keller, Glenn R. Kraus, Paul R. Ladd, Jesse W. Lankford, Jr., Sumner P. Lapp, Jack L. Laubscher, Glen V. Leland, Jr., Edward Leroy Leonard, Rex E. Lewis, William C. Lewis, Sumner E. Locke, Raymond Lucia, Gordon M. MacLeod, Claud McAden, Howell P. McCorkle, Charles S. McCune, John J. Mackey, Morris E. Mansell, Jr., Sidney L. Miller, James W. Moore, James P. Morgan, Robert E. Nelson, Charles Gard Oliveros (With Oak Leaf Cluster), Thomas C. Parkinson, Samuel J. Parks, Seymour J. Ponemome, Clifton K. Pool, Dale B. Prescott, Jack Donald Pritchard, John G. Rankin, Frank S. Rathbone, Jr. (With Oak Leaf Cluster), William E. Read, Percy W. Robinson, James P. Rogers, Claire M. Smartt, Francis David Schroth, Jr., J. F. Segrest, Jr., Lee Roy Senter, Rodney Nelson Shearin*, Joel M. Silverman, Paul J. Slocum, Sidney Slotoroff, Nathan Sutin, Grant Swartz, Thomas K. Taylor, John J. Testa, Downey L. Thomas, Jay T. Thompson, Jr., Harold R. Townsley, Peter Val Preda, Sylvan H. Viner (With Oak Leaf Cluster), Brent F. Walker, William P. Walsh, Jr., William T. White, Jess O. Wikle, Jr., Russell S. Wilkin, Aime J. Wood, Jr. **MASTER SERGEANTS:** William J. Dabney, James H. Daddysman, Alpha G. Storey, Joe L. Wilderman, Elmer R. Wyckoff. **TECHNICAL SERGEANTS:** William E. Andrews, Phillip H. Arnaud, Richard V. Arrington (With Oak Leaf Cluster), Kenneth W. Baldridge (With Oak Leaf Cluster), Rex W. Barada (With Oak Leaf Cluster), Glen Beard, Harold V. Brooks, John W. Buck, Francis X. Caulfield, John T. Durden, Roland E. Gates (With Oak Leaf Cluster), Raymond B. Hoke, Jr. (With Oak Leaf Cluster), Clarence V. King, Joseph G. Marcelonis, Jack G. Richardson, Bensing Webster. **STAFF SERGEANTS:** Frank G. Antosz (With Oak Leaf Cluster), Forest W. Bertsch (With two Oak Leaf Clusters), Clarence K. Blend, William Herrington Bosworth, Joe Bowles (With Oak Leaf Cluster), Charlie B. Brown, Howard A. Clarke (With two Oak Leaf Clusters), Solomon Cohen, Charles P. Chalcroft, William Joseph Everhard (With two Oak Leaf Clusters), Julius A. Foster, George H. Fowler, Jr., Wilford O. Gaines, William J. Pash, Walter J. Polinski, William M. Prull, Charles S. Savoini, Walter S. Sloan, Charlie O. Smiley. **SERGEANTS:** Jack Belk, Nick Bober, Henry P. Bobinski, Raymond Gerald Boucher, Arthur N. Bouthillier, Lloyd A. Burkholder, Joseph M. Caserta, Ernest B. Clark, Claude E. Cockrell, Beryl R. Cundick, Edward J. Czekanski, Herman W. David, Walter S. Deahl, Warren J. Ewing, Joe G. Ferrero, George Fry, Michael Geroik, Morris W. Hancock, Robert E. Hawkins, Durwood W. Hitchens, Chester A. Martin, Horace E. Moore, Chester H. Oliver, Ralph O'Neill, Paul E. Price, Richard Reading, Robert L. Rice, Thomas B. Roberts, John F. Rose, Daniel O. Ruttiger, Howard J. Ryerson, Richard F. Schnorr, Leo W. Shelton, Jack P. Thomas, George H. Townsend, Richard W. Troxell, Thaddeus J. Wallence, Edward B. Wisnowaty. **CORPORALS:** Paul M. Drossel, Robert W. Harrington, John W. Melvin, Donald J. Morris, George L. Pohlig. **PRIVATE FIRST CLASS** Willard R. Madison. **PRIVATES:** William I. Hall, Charles Jimmick, Charles E. Martin, Michael D. Mazzeo. ☆

Lt. B. L. Barber

Capt. R. E. Kimmel

Capt. Henry P. King

Major A. J. Baumler

S/Sgt. Wm. J. Pash

Lt. W. J. Emerson

Capt. Albert Nowack

Lt. J. A. Grigsby

Lt. C. F. Gallmeier

Lt. Clyde de Baun

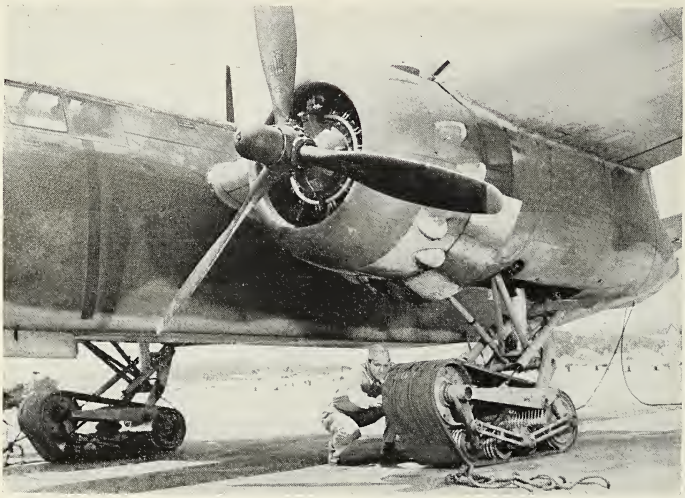
Col. J. M. Joplin

Lt. James M. Hair

Lt. Jack Donaldson

Lt. J. R. Irvin

Lt. Clare M. Smartt



Caterpillar Landing Gear

A caterpillar landing gear, which may be the forerunner of new-type landing gears for large aircraft, has been successfully tested by Wright Field engineers. It is the first ever built for aircraft in the United States.

The increased footprint area provided by the rubber track will enable heavy planes to operate from soft ground or deep sand which is impossible for present aircraft with conventional tire-wheel landing gears. Such a gear, for example, would make it possible for the giant 62-ton B-19 to land on any airfield instead of being restricted to concrete runways.

The new landing gear is constructed with steel bracing and grooved aluminum bogey rollers. An air spring partially cushions the landing impact. The rubber track has a circumferential wire beading and is grooved to fit into the roller grooves, thus preventing side-slippage.

On large aircraft this type of landing gear would save weight and would be easier to retract than such tires as the 96-inch ones of the B-19.

Landing characteristics of the A-20 with the caterpillar tread are the same as with the ordinary tricycle gear.—**Lieut. R. V. Guelich, Wright Field.**

Transient Aircraft Traffic Board

A new and improved transient aircraft traffic board has been developed at the Houlton (Maine) base of the North Atlantic Wing, Air Transport Command. The board is capable of handling complete data on as many as 180 inbound and outbound flights on a single wall of a small room and has been in satisfactory use for several months. A glance gives a quick visual reference on all transient plane movements to or from the base.

It replaced the conventional blackboard used in most operations offices, which in the same space could list only twenty or thirty flight plans, and has greatly simplified the work of operations clerks.

The new system was conceived by Col. James A. Ellison, base commander, and constructed in collaboration with Capt. Ralph J. Gross, base operations officer, enlisted men of the navigation plotting section and workmen of the 46th Sub-Depot.

Actually there are four separate boards but placed side by side on the wall they give the appearance of a single board. The boards in order are Inbound, On Base, Outbound and Destination Arrived. The On Base and Destination Arrived boards are each twenty inches wide, while the other two measure forty inches each. Overall height is 45½ inches.

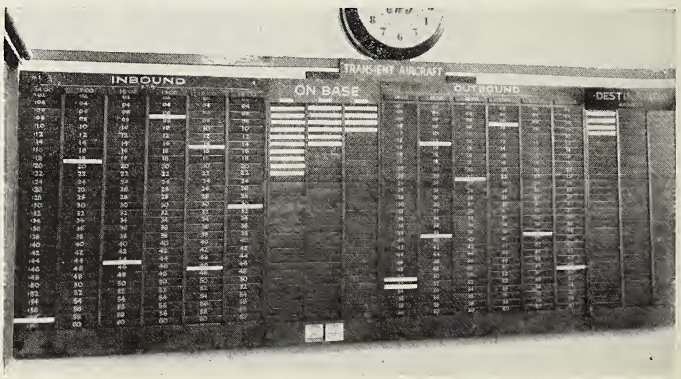
On both the Inbound and Outbound boards there are six columns, at the top of which are hooks where hour indicators are hung. Each column is sub-divided into thirty slots, numbered consecutively from top to bottom at two-minute intervals from :02 through :60. This two-minute calibration of each hour is believed to be sufficiently accurate for recording ETA.

Hour indicator strips for the top of each column are numbered consecutively from 00:00 through 23:00. Only twelve of these strips are needed because both sides are used, the numbers on the two sides of each being six hours apart. At the end of a six-hour interval it is only necessary to turn over the hour indicator strips to make the board ready for the next six hours of operation.

In this system colored cards in various shades are used, each color representing a particular type of plane. For example, salmon represents a B-17; tan, B-25; pink, B-24; pale blue, A-20; buff, B-34; canary, A-29; dark blue for scheduled airlines and cargo planes, and white for all others.

The 4-inch by 6-inch cards are used on both sides—one side for the Arrival Record, the other for Departure. Three-fourths of an inch of the card protrudes at the top when it is in position in its

A convenient new Transient Aircraft Traffic Board.



slot on the board. The following data is recorded on the arrival side of this portion: date, serial number, type, pilot, from, departure, ETA, arrival and parking position. On the lower section of the card, which does not show when it is in the slot, are two divisions—schedule and crew. Facts under "schedule" include: arrived from, home station, mission and remarks. Information on the "crew" side is pilot, co-pilot, navigator, radio operator, flight engineer and others.

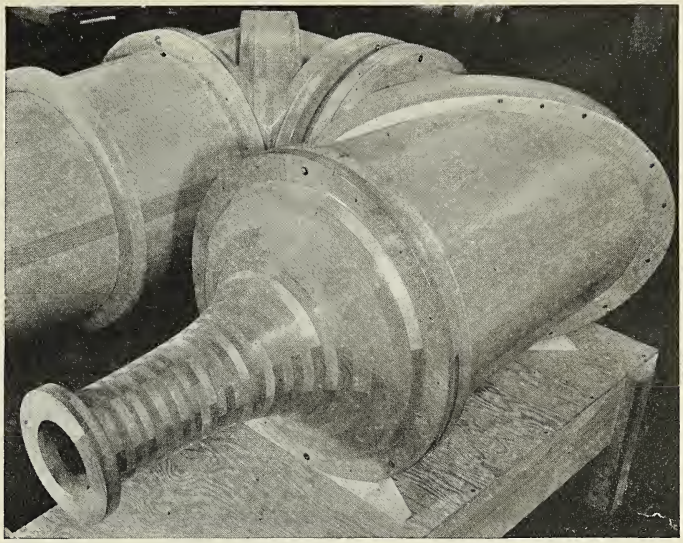
The departure record on the opposite side of the card lists across the top: date, serial number, type, pilot, to, departure, ETA and arrival. Under "schedule" is given: to, mission, per authority, cleared by and remarks. "Crew" information is similar to that on the arrival side.

With this system it is possible by glancing at the board to get a complete outline of information on any and all inbound and outbound traffic, as well as on all planes on the base. At the end of the day the cards are filed according to date making them readily available for reference. One card gives complete information on any craft, making it unnecessary to search through a stack of bulky flight plans. The file requires a minimum of space.

While the board is simple for the operations worker to understand, it may appear complicated to casual visitors in the office, who do not know what the colors represent and can not get close enough to the board to read any information from the cards.

Flexibility is a feature. An adaptation would fit almost any particular situation at any base. The board can be readjusted easily to record the status of planes, weekly or monthly aircraft movements, movements of planes to specific bases or any other special uses an operations officer might wish to apply.

Gone forever at the Houlton base are the days when operations clerks were straining to write on the top lines of unsightly blackboards and attempting to wipe chalk dust from their hands, hair and uniforms.—**PRO, Air Force Base, Houlton, Maine.**



Wooden model of the new 600-mile-an-hour wind tunnel under construction at Wright Field. The model is built to a scale of one to twenty.

Powerful New Wind Tunnel

Designed for testing models of high altitude bombers and fighters, a funnel-shaped, ten-foot wind tunnel which will generate winds reaching a velocity in excess of 600 miles an hour at a temperature as low as 67 degrees below zero is being constructed by the AAF Materiel Command at Wright Field.

The tremendous velocity will be made possible by using two 20,000 horsepower motors to drive the huge fans and by tapering the tunnel from its maximum cross-section to a minimum diameter of ten feet at the throat where the blasts will reach their highest speed.

Temperature and pressure conditions found at altitudes ranging from sea level to 50,000 feet will be simulated in the new tunnel. A monster storage-type refrigerator system can reduce the temperature of the wind as it roars through the tunnel to 67 degrees below zero.

Supplementing the work of the familiar twenty-foot tunnel which in its period of operation to date has won wide acclaim, the new tunnel will permit tests of an entirely different nature, including icing and winterization experiments.

The twenty-footer is an atmospheric tunnel, highly valuable in testing aircraft and component parts under simulated sea level conditions. It was not designed, however, to reproduce altitude pressures or temperatures and as a result such conditions cannot be controlled in it.

The constant increase in speed of planes at higher altitudes has required the installation of the new structure. The new testing tunnel will be built in the shape of a long, narrow rectangle of the closed return type.

Its operation at a vacuum of less than

ALL-PURPOSE CRASH TRUCK

To take care of crashes occurring at points away from base, a mobile crash unit has been assembled by Capt. George Saltzgever of the 333rd Sub-Depot at Grenier Field, N. H. The unit permits crash crews to handle a wreck at the scene eliminating trips back and forth. The crane has a lifting capacity of 3,500 pounds at a 30-degree angle and is hand operated. Mounted on the trailer platform is a gasoline-driven generator and air-compressor unit.—Capt. L. C. Martin, Assistant PRO, Grenier Field.

one-eighth atmospheric pressure, approximating pressure conditions found at 50,000 feet, is one of the engineering features of the tunnel.

Important aircraft modifications necessitated because of high altitude operations, addition of armament, changes in cowling and other alterations exert a direct influence on the speed of planes and on changes in aerodynamic characteristics. Since many such modifications made on the Army's planes originate at Wright Field, a wind tunnel capable of testing models of planes and parts suitable for high altitudes will be a boon to the work of the Materiel Command.

The refrigeration system, housed in a separate building, will contain a cold chamber for testing equipment at minimum temperatures. The four doors of the chamber weigh more than four tons each and measure 25 by 25 feet.

A series of cooling coils will regulate the temperature of the air as it speeds through the tunnel. To simulate conditions found at 50,000 feet the air is chilled to sub-zero temperatures as it passes over the coils and by the time it reaches the throat of the tunnel drops to a temperature of 67 degrees below zero. The tremendous decrease in temperature at that point is due to the lowering of air pressure as the speed of the air is increased upon reaching the narrow throat. Refrigeration engineers estimate that this minimum temperature can be held for an hour or more before the cooling process need be repeated.

Before an actual test is run it will be necessary to chill the cooling coils with vast quantities of calcium chloride brine solution. This solution is brought to a temperature of forty degrees below zero by means of two huge compressors before being circulated through the coils. Twenty hours are required to complete the job.

The newest and fastest of the Army's wind tunnels will be constructed of steel plate varying in thickness from $\frac{3}{8}$ to $1\frac{1}{4}$ inches. The two 20,000 horsepower motors will drive the counter-rotating fans, each of which measures nineteen feet in diameter. The fan blades, made of wood, are being fabricated at Wright Field. Control equipment governing the twenty-foot tunnel will also be used for the new project.—**T. A. Berchtold, Wright Field.**

Maj. Robert E. Reed and the emergency tourniquet system he has devised for his flight coveralls.

Tourniquets On Flying Suits

A simple method of safeguarding the lives of combat crews who may be injured during missions has been devised by Maj. Robert J. Reed, 8th Air Force pilot. With a pair of scissors, some heavy ribbon and six dowel sticks he has equipped his flight coveralls with six emergency tourniquets at vital artery pressure points on arms and legs. Pencils may be used instead of dowel sticks if necessary.

This is how they are used. Suppose the ball turret gunner has been hit in the arm by a shell fragment and is bleeding profusely. Quite often no one can come to his aid while the fight with the enemy continues, so the gunner, using his free arm, reaches into his breast pocket and pulls out a dowel stick. A heavy ribbon, previously sewed into the upper arm of the flying suit, already encircles his arm. About three inches below it is a loop that also has been sewed or cut into the suit.

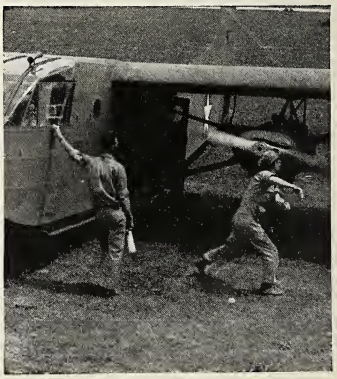
Taking the dowel stick, he slips it between the ribbon and suit and twists it as a tourniquet until the blood flow is stopped, then pushes the lower end of the stick through the loop on the sleeve and anchors the tourniquet. Besides safeguarding his own life by halting the flow of blood, he also can man his guns or, if they have been knocked out, can help other crew members at their posts.

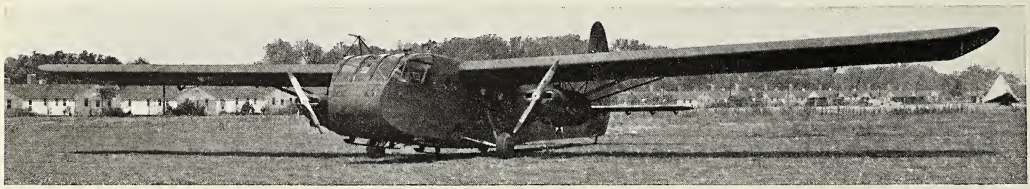
This same application is possible on the legs, either below the knee or on the upper thigh. By releasing the tourniquet every fifteen minutes, clotting is avoided.—**Wright Field.** ☆

AAF Power Gliders

The AAF Aircraft Laboratory has developed an engine installation for the CG-4A glider that can be mounted in one hour. The engines, one for each wing, are 130 horsepower air-cooled Franklins which actually are package power plants. Gas tanks and instruments are carried in the engine nacelle.

The power glider, known as the XPG-1, is slow and has a limited range. When empty it can take off and fly under its own power, and when loaded it can extend its range after being released from the tow plane, thus giving the pilot more choice in selecting a landing spot, as well as enabling faster cargo service between bases.—**Wright Field.**





to the contribution "B"-40 pilots made to our situation in the China-Burma theatre. During the spring of this year, the Japs made a determined effort to clean up the Assam-Burma frontier and destroy certain of our installations which we very much wanted right where they were. What stopped them was the stuff dropped three or four times a day by swift little planes which appeared as if they had a bad case of goiter.

Below the railhead at Myitkyina the "B"-40s indulged in a game called "threesies"—blowing up one large bridge and then two smaller ones, one on either side. By the time the poor Nips got the little ones repaired so they could work on the big one, similar damage had been done to several other points along the line. Supplies just never reached the Jap troops who needed them and the monsoon finds our foul-breathed friends right back where they started—but tireder and sadder.

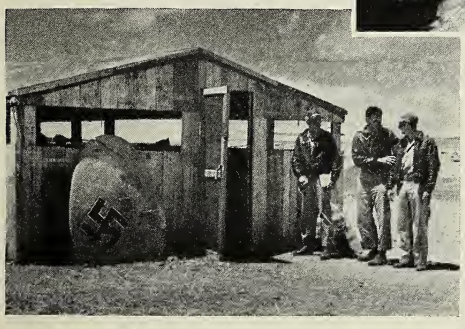
THE 'B'-40 OVER BURMA

(Continued from Page 5)

By now practically all the pilots in the fighter group which fostered the "B"-40 have mastered the technique of dive-bombing with the 1,000-pounder, but there's still the six-man first team which, literally, has never gone after a target and not destroyed it. For aspirants to his varsity, Colonel Barr, who recently received the Silver Star for his work with the 1,000-pounders, has laid down a set of rules. He has taught his boys a definite pattern based on a method of target approach that is meticulous in its detail. Like a well-coached football team, the pilots follow the pattern—day after day after day.

Out here it's taken very much as a matter of course and frequently A-3 has trouble deciding whether to send the B-25s or the "B"-40 after some particular target. The only people who retain their astonishment—except, perhaps, the Japs—are the pro-Allied Naga headhunters of northern Burma who have had some very close views of our work. They speak of the 1,000-pound-bomb-carrying P-40 as "the double-airplane-which-drops-half — BOOM!" ☆

BASE OASIS IN NORTH AFRICA



The exterior of this squadron's recreation center in North Africa is decorated with the rudder of a fallen Messerschmitt. The interior view is typical. Note the phonograph at left.

By Lieut. SNOWDEN T. HERRICK
NORTHWEST AFRICAN STRATEGIC AIR FORCE

AIRMEN get fed up at times with all work and no play. And there are comparatively few opportunities for recreation at an airbase in the field in North Africa.

But one B-26 squadron worked out a solution by building a "community center" out of odds and ends of available scrap material. It's not as finished as the average club in the States, but it's a howling success just the same. The clubroom was put together in only two days after Maj. Richard B. Polk, squadron CO, started the ball rolling. Lieut. Robert O. Hauser, navigator, calling on his pre-AAF experience as an architect, did a great deal of the necessary procurement and supervised the construction. The squadron carpenter, Master Sgt. Frank Peters, a full-blooded Iroquois, took care of the carpentry.

Wood for the building, which came mostly from packing boxes used for fragmentation bombs, was collected after an unrelenting search. Heavy beams and posts served originally as crates for heavy equipment. Tents and tent flies made a neat waterproof roof.

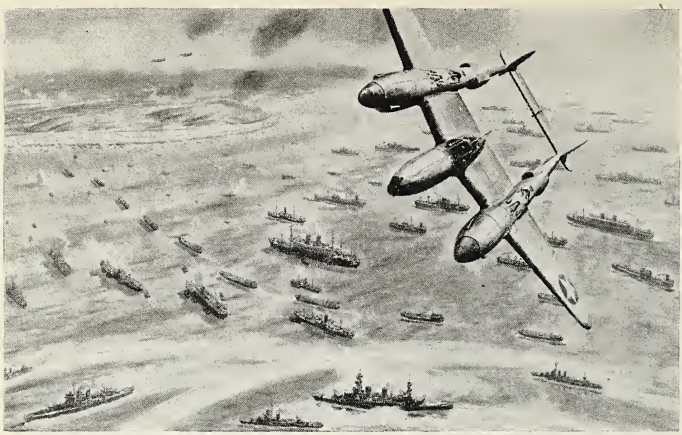
The structure is portable and the squadron fondly hopes to pack it along if and when it moves to another location. The lumber alone makes the building precious in the land of few trees.

The club is furnished in good taste with a bar in one corner made of metal linings salvaged from ammunition boxes hammered flat and pieced together to make a smooth surface. The usual odds and ends of wood served as the bar framework.

A modernistic ceiling lamp was procured at a nearby native town. Most of the chairs are the nail-less, woven straw variety which the Arabs invented to satisfy European seating customs. The card tables are homemade.

The club has proved so profitable under the management of Lieut. S. A. Kaufman that cigars, cigarettes and even candy are on the house. The supply problem is sometimes difficult. Because of this uncertainty the "bartender" is often forced to serve water straight.

On one occasion the pilots, navigators and bombardiers brought in some Coca Cola syrup. They refuse to reveal the source, except to say that the syrup came from a long way off. The soda water they had been saving as a mixer had disappeared the previous night, but the cokes tasted OK mixed with plain water. ☆



This is Illustrator Noel Sickles' conception of a portion of the Sicilian landings. The drawing was done on the basis of intelligence reports and on-the-scene accounts. More than 3,000 surface craft participated.

THE LUFTWAFFE AT BAY

(Continued from Page 7)

Once we had established ourselves, we began to team closely with the advancing ground armies—our task as part of the tactical air force. The principles involved in this operation had been employed successfully in the Tunisian campaign, and now that we were putting them to use for the second time the job came much easier and, if anything, it was performed more efficiently.

In addition to protecting our ground forces from threats of air attack, we flew strafing missions against ground targets —enemy tanks, artillery emplacements, troop concentrations and supply routes. The major share of this particular task, however, was carried out by the fighter-bombers—A-36s, bomber version of the P-51, and the P-38s and P-40s—for which we usually flew cover.

Just as in the North African campaign, there was complete cooperation between air and ground forces in the battle areas. And the lessons learned in Tunisia paid dividends in the advance of our forces in Sicily.

From our standpoint in the tactical air force, the lack of anything even remotely resembling the air opposition we encountered in North Africa made our part in the operations easier to carry out in most respects. Lack of opposition, however, can be a dangerous thing in offensive operations, and it caused more than little concern in the earlier stages of the Sicilian drive. When you encounter steady opposition, you have something on which to base your plans. Without it, you must determine where and when the enemy intends to concentrate his limited air. Otherwise, your superior force can be seriously crippled if it is spread too thinly —which it is almost sure to be without a careful analysis of the opposition's possible moves and the proper application of your own decisive air power. In addition, with nothing in the skies to fight most of the time, pilots unconsciously adopt a false sense of security and become careless unless they are continually prodded to keep alert. A fighter pilot should always remember it's the guy you don't see who knocks you out.

THE enemy pilots we met over Sicily no longer had the same fight, the same skill and the same training that they had demonstrated over Western Europe, or even Tunisia. Our group had seen this tailing-off quite clearly weeks earlier in intercepting enemy bombing raids on our occupation forces in Pantelleria. At that time, flights of from ten to twenty fighter-bombers, escorted by fighters, would come in on a raid, and the moment we engaged them in combat they would try to break away and head for home. They seemed to be panicked in their scramble to avoid a fight. We shot down 28 FWs and MEs in two and a half days, with a loss of only two of our fighters.

This reluctance to fight can be attributed in no small degree to the superiority of the Spitfire over the best of the German fighters. We knew we could fly rings around the enemy, and it didn't take him long to discover the same thing. As far as our group was concerned, enemy fighters were always on the defensive. Another factor was the lack of experienced leaders on most of the enemy missions. Even on the occasions when a good leader was participating, the other pilots seemed to follow him around the sky like a flock of geese.

We have every reason to believe that many of the planes which raided Pantelleria, and later Malta, were operating from the same field we eventually occupied on Sicily. One of the more convincing pieces of evidence discovered at the Sicilian base was a carefully drawn topographic map of Malta found in the operations office. Such details as the location of fighter bases and flak installations were marked as targets on the map.

Just as the enemy pilot's morale seems to be going downhill, our morale has been, and continues to be, tremendously high. This applies to ground crewmen as well as flying personnel.

When I returned to Washington—while the Sicilian campaign was still in progress—I left one of the finest groups in anybody's air force. Our outfit is highly confident of victory, but not cocky. It's just that nobody ever goes on a mission with the thought, "Maybe I won't come back."

Every man in the group knows the value of teamwork. Every man knows that everyone else depends on him to do his job well. As for the ground crews, they seem to be happier than the pilots when a good job is done in the air. ☆

PICTURE CREDITS

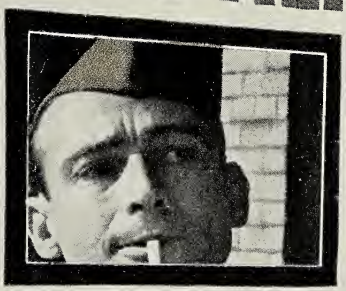
5: 10th Air Force. 9: British Ministry of Information. 12: 7th Air Force. 25: Wright Field, Ohio. 27: Harry Conover Cover Girl. 28-29: Acme Newspictures; Signal Corps. 30: Brooks Field, Texas. 33: Bolling Field. 37-38: Drawings by 1st Fighter Command Volunteer. 46: Patterson Field, Ohio. 48: Boling Co. 55: 12th Air Force. Third and Fourth Covers: AIR FORCE Editorial Office. All other photographs secured through official Army Air Forces sources.

Answers to Quiz on Page 39

1. (b) Eight.
2. (c) China.
3. (b) Wind velocity.
4. (c) A Jap stronghold on the northern tip of the Kurile Islands.
5. A system of aircraft identification which gets its name from the structural units which the student is drilled to take up in order: W—wings; E—engines; F—fuselage; T—tail.
6. (a) Liberator. (b) Mustang. (c) Commando. (d) Mitchell.
7. (b) C-54.
8. (d) Resonance.
9. Ordnance.
10. (c) Louisiana.
11. Absolute ceiling is the maximum height above sea level at which an airplane is able to maintain horizontal flight under standard air conditions; service ceiling is the height above sea level, under standard conditions, at which a plane is unable to climb faster than a specified rate.
12. (d) A sudden violent gust of cold land air.
13. (b) 4000 miles.
14. (b) Thirty degrees.
15. (b) A small auxiliary parachute.
16. False.
17. (c) A Russian pursuit plane.
18. (d) Lieutenant General.
19. (a) 6080.2.
20. Dornier 217E2 Bomber.

PRINTED IN U.S.A.

THIS MAN WANTED ALIVE!



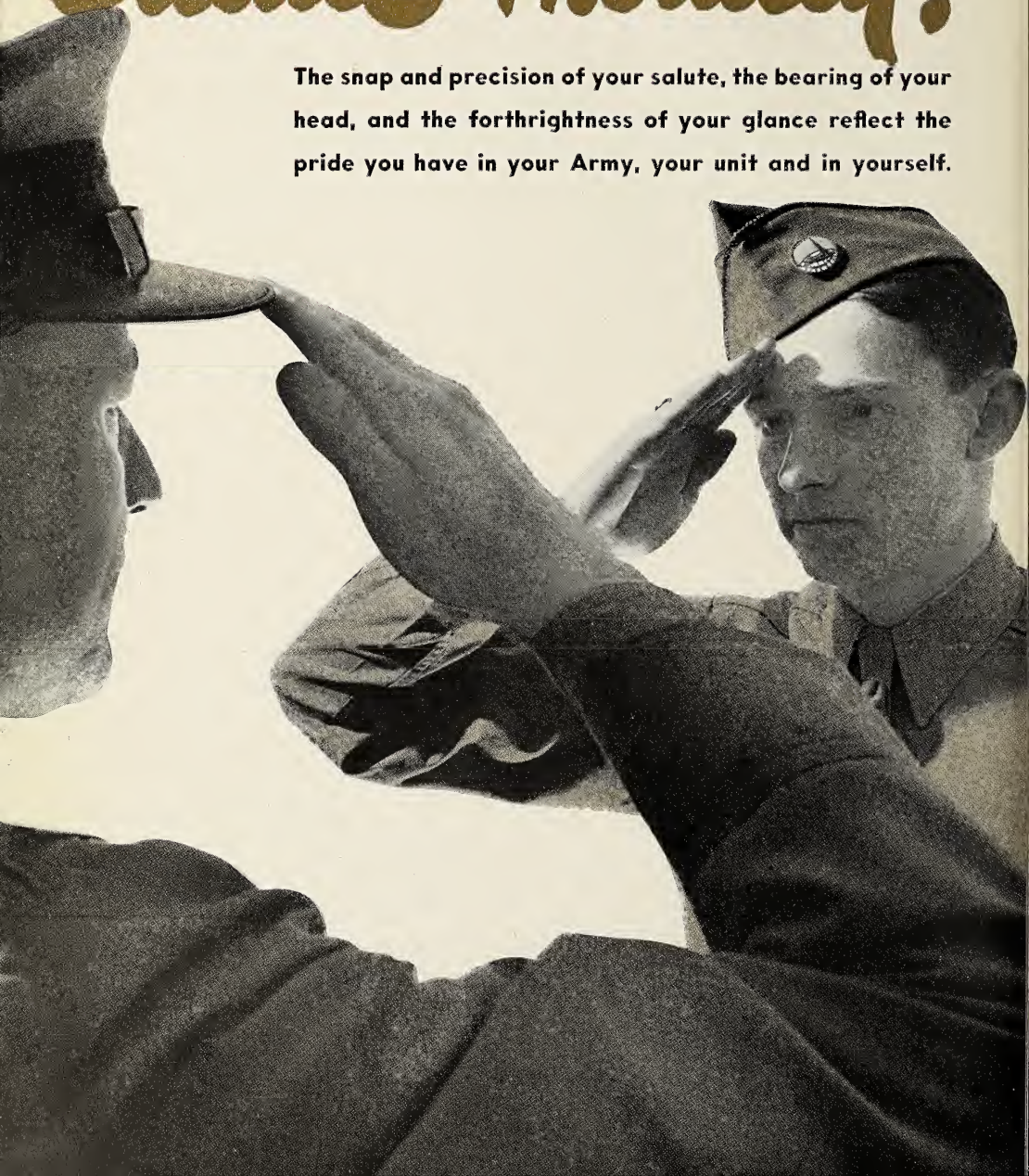
But CARELESS talk can kill him!

DON'T DIVULGE FORTHCOMING TROOP MOVEMENTS, DESTINATIONS, NUMBER OF TROOPS, TYPES OF AIRPLANES OR QUANTITIES OF SUPPLIES.

THE ENEMY IS ALL EARS... ... DON'T BE ALL MOUTH!

Salute Proudly!

The snap and precision of your salute, the bearing of your head, and the forthrightness of your glance reflect the pride you have in your Army, your unit and in yourself.



AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

NOVEMBER 1943

Vol. 26 No. 11

NOVEMBER 1943

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AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

November Brief

THE BOMBING ATTACK which destroyed vital Axis oil refineries at Ploesti, Rumania, on August 1, was one of the most important aerial missions of the war. Back of the attack were weeks of intensive planning and training. A comprehensive report on the attack is presented in a special section of this issue, beginning on Pages 8-9. It contains the story of preparation, General Brereton's pre-attack message to his flight leaders, a first-person "over the target" account of the mission, a summary of the damage inflicted and photographs taken from the bombers during the attack.

AN ARTICLE on the importance of air discipline in bombing operations has been written for AIR FORCE by Brig. Gen. Frank H. Armstrong, Jr., former group CO in the 8th Bomber Command in England and now commanding general of a bombardment wing of the 2nd Air Force. General Armstrong participated in more than a dozen raids over the Continent. He was the lead pilot in the first American raid over France, in which only twelve B-17s took part, and he flew the lead plane again in the first American mass attack on Germany. General Armstrong was operations officer on General Eaker's staff when the 8th Air Force was activated, and he later commanded two combat groups. His real experience, General Armstrong says, was "just being with the men. I ate, slept and lived with them. I was a member of their outfit. That was the best of it—just being one of them. There's nothing quite like it." General Armstrong's article appears on Page 5.

OPPOSING FORCES inadvertently exchange equipment secrets during wartime. Early in the war, Axis forces learned much vital information about British and American aircraft from wrecked planes forced down over enemy territory. Enemy planes and equipment have come into our hands in the same manner. The article on Page 38 tells what our engineers learn in their examination of captured enemy equipment and offers many interesting comparisons of this equipment with our own.

THE FLYING TRAINING and Technical Training Commands have been consolidated to form the Army Air Forces Training Command, with Maj. Gen. Barton K. Yount, who headed the former flying training organization, as commanding general. The operation of our reorganized training program is described on Page 27. An organization chart of the new Command accompanies the article.

EVEN BEFORE the last Japs had been wiped out of the Aleutians, American bombers began softening the northern road to Tokyo with attacks on Paramushiru, important enemy base in the Kurile Islands. An account of the first two raids on Paramushiru has been written for AIR FORCE by Maj. Louis C. Blau, co-pilot of one of the bombers on the first raid and a flight leader on the second, and Maj. Frank T. Gash, also a flight leader on the second mission. Their article appears on Page 18.

IN ITS MAY issue AIR FORCE published a second lieutenant's account of his life in OCS at Miami Beach. A copy soon reached a forward base in New Guinea, where at least one reader was more than casually interested in the Miami Beach story. He, it seems, had been a member of the first class to go through OCS in Australia, and his routine had been so at variance that an article by him for AIR FORCE came "quite as natural as a newly dug slit trench after a surprise raid." We agreed. Lieut. W. F. Houha's story "OCS—Australia" appears on Page 22.

The Front Cover

The new P-51 Mustang, high-altitude fighter with the Packard-built Rolls Royce engine, is pictured on this month's front cover. Test pilots at Wright Field are enthusiastic over the combat possibilities of the new 51. They particularly praise its speed at high altitudes and ease of handling. An article describing the development of the P-51 appears in the Technique department on Page 31. Tech. Sgt. Roger Coster, staff photographer, took the cover photo at an east coast port of embarkation.

AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

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CROSS COUNTRY

INCREASING emphasis is being placed on the importance of keeping all air crew members informed concerning targets for strategic bombardment missions, the value of the objectives to the enemy and the results to be gained by their destruction.

In tactical air force missions against military targets, crew members can see the enemy objectives and usually deduce for themselves the destruction hoped for in the attack. But in the strategic bombing of industrial and communications targets, it is more difficult for the average man to understand why a particular target has been selected and what the desired results might be. In fact, other objectives spotted from the air by the uninformed sometimes appear far more inviting than those selected for the mission.

Bombing objectives are selected for good reason, but unless they take on full meaning for every man participating in the attack, the operation can easily become "just another mission." This attitude can be avoided by the thorough briefing of air crews, by airplane commanders discussing missions in detail with members of their crew and informing them on the results of the mission. Ground crews, as well, can benefit from information on the accomplishments of bombing attacks.

These points have been stressed by returning combat crews, especially enlisted personnel, and Headquarters is encouraging appropriate action.

REPRINT OF THE MONTH

In the March issue we published an organization chart of the Army Air Forces and announced that reprints would be available. A flood of requests for the chart resulted. Appearing in this issue (pages 28-29) is the organization chart of the new AAF Training Command, in which the Flying Training and Technical Training Commands have been consolidated. A limited quantity of reprints has been made available for general distribution upon request to the Service Division, AIR FORCE Editorial Office, 101 Park Avenue, New York 17, N. Y.

SALESMANSHIP

"WHEN we landed that first day in Sicily everybody was friendly as hell," says Sgt. Robert M. Price, a paratrooper from Yakima, Wash. "They gave us everything. They took us down in their cellars and poured out big pitchers of red wine. They always washed the pitchers and took the first drink to show us it wasn't poisoned. That first day it seemed they couldn't do enough for us—and that wine was good!

"But next day it was different. They had cooled off, I guess. They decided there weren't so many of us and maybe we weren't so powerful after all. They surely were different.

"We had fifteen Italian prisoners and even they began to think the Axis would win. That morning we saw two American observation planes in the sky and we all stood there watching them. They were flying very slowly and looked about as defenseless up there as cow sheds.

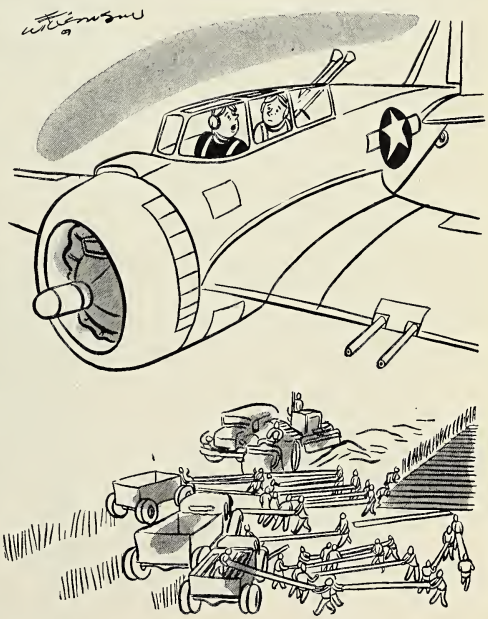
"Suddenly three Italian planes attacked them. The Italian prisoners jumped up and began to cheer. It didn't look very good for our side. We knew the American planes would be destroyed, and the Italians began making wisecracks.

"Just at that moment six P-38s dove out of the sky in a wedge and burst one of the Italian planes into flames. The P-38s climbed up again and came right back in formation. They tore the second Italian plane all to pieces. Then they got the third one before it could run away. It looked like those P-38s were putting on a show just for our benefit.

"All the while it was going on those Italian prisoners just stood there with their mouths hanging open. After it was over they sat down again. They said the Americans were okay. They didn't give us any trouble after that."

A DIFFERENT WORLD

That feeling of nearness to a Supreme Being which comes to many men in flight has been described many times, each man expressing it in his own way. This letter



"Our orders are to cruise around a few minutes until they build an airfield." —FRITZ WILKINSON

from a young flyer, to the parents of a pilot missing in action, seems to describe the feeling in a particularly sensitive manner.

"My deepest sympathy is always for the sorrow of those left behind, because often they cannot understand the philosophy of those of us who fly. When a man has spent hundreds of hours in the air, he finds quite a change taking place in himself. Those hours are spent (many of them in solitude) in an entirely different world from those to which he was formerly accustomed. Up there he has plenty of time to think as he views the limitless expanse surrounding him, and breathes the pure air that has not been soiled by our earthly life.

"He cannot keep from realizing his proximity to a Supreme Being and feels His hand guiding and holding the plane aloft. Actually he is sorry for the unfortunate earthbound people who never have experienced the privilege of such solitary communion. So beautiful are some of the sights viewed by a pilot that he can almost feel that he has been permitted a glimpse of what lies beyond.

"It is because of these thoughts and feelings that a pilot has no fear of what is to come. He knows that he is always welcome and has been so close so many times that he nearly knows what to expect."

That letter reminds us of what Wing Commander John Barnes, an RAF night fighter, said of the spiritual feeling which comes to many airmen. The Wing Commander, a song writer in civilian life ("Don't Sit Under the Apple Tree," "Little Lady Make Believe," and others) told how he felt after meeting the Nazis for more than a year in their rage to destroy England.

"You get so you enjoy it," the young Britisher said. "Remember that lovely poem one of your American pilots wrote, about being so high and solitary that you can almost 'touch the face of God.' Well, that's the way it is. You see a glow through a fringe of cloud and you dive out for it. Might be a Jerry's exhaust flame, you know. Then you come through the cloud and there, deep on the night's black velvet, shines a star. That's what it is—a beautiful star!

"It's beautiful when you're up 30,000 feet and look on the incendiaries in Kent, and then across the Channel you see our bombs retaliating, spilling their bloody hell on the French coast. It's the contrasts. You can't ever get used to them. If you follow my own thoughts you can see how these contrasts—the exquisite beauty of the countryside and the crash of death—are more dramatic than the war itself."

Read and Remember

Reports indicate that a surprising number of U. S. airmen shot down in Germany have neglected to carry their identification discs. It is reasonable to assume that due to this carelessness some of our dead have been buried without identification.

Without the regulation "dog-tags" our personnel can be held by the enemy as spies and saboteurs on the pretext that they cannot be identified as members of our armed forces. They may also use this pretext to put them in solitary confinement for fairly long periods for softening purposes and to attempt to elicit information from them.

AR 600-40, Change 10, Paragraph 36, is very specific in directing that each member of the Army shall wear his regulation identification tags at all times.

Sahib Snob

An AAF tech sergeant and his brother, a major with the Army Service Forces in India, had their pictures taken together just before the major left the States. Recently the sergeant received the following letter from his brother:

"My bearer—a Mohammedan boy who is the spice of life and breaks my monotony by efforts to get him to work—saw the picture of you and me the other day. With a very contemptuous sound he grunted 'sergeant!' Then he pointed to me and said, 'Master very big Sahib'."

After displaying this letter our sergeant slowly folded it and returned it to his pocket.

"I trust my brother hasn't lost too much face," he said.

Missing Parachutes

THREE stations have entered candidates this month in our who's who of missing parachutes. Many stray chutes are finding their way home through this monthly feature and all stations are invited to use this medium.

Lost:

One 24-inch chest type, Serial 42-766327; return to Commanding Officer, 22nd Transport Transition Training Detachment, DTR, ATC, Municipal Airport, Atlanta, Ga.

Number 42-193842 (Type S-1 AN-24); return to Headquarters, 387th Sub-Depot, Office of the Engineering Officer, Pecos, Texas.

Number 42-445971 (Type S-1); return to 34th Base Headquarters and Air Base Squadron, Squadron Engineering Officer, Grenier Field, Manchester, N. H.

Last Flight

Old 666 took off from a South Pacific airdrome one morning like any able-bodied B-17 and came back a pile of salvage wallowing through the sky. There wasn't much of her that hadn't been shot up and her bandaged crew resembled a rehearsal in first aid.

It was a reconnaissance flight over Bougainville Island and while photographing the Buka runway the crew spotted a string of enemy fighters, about twenty. Half of them taxied out on the strip to take off. But Old 666 headed south along the west side of the island and kept right on taking pictures.

The first fighter moved in, then three more, one sailing in low at ten o'clock. Fire from his guns wounded the bombardier, the pilot and the engineer, destroyed the hydraulic system, damaged the control cables, smashed the pilot's rudders, set the oxygen bottles in the cockpit afire and knocked out all flight instruments but the airspeed indicator.

The bombardier, despite his wounds, kept firing on the enemy fighter until it shattered apart. The navigator, though wounded in the face and unable to see his target, blasted away at another attacker while the pilot, wounded in the legs and arms, continued to fire a fixed gun at still another Zero.

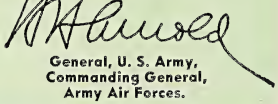
An explosive shell crashed through the nose of Old 666 and knocked the bombardier and navigator back into the catwalk under the cockpit. A burst of small caliber slugs from the same enemy plane

HEADQUARTERS, AAF

To all Personnel:

Your attention is called to the increasing number of published statements attributed to Air Force personnel, containing expression of opinion on the length of the war, the quality of our efforts and the status of our opposition. Such opinions can serve no good purpose and when they are publicly interpreted to represent official viewpoints, they are both harmful and dangerous. If the present practice continues, the morale of industrial workers, our production of airplanes and estimations of the value of attacks on the enemy will be seriously impaired as each unfounded statement or ill-considered assertion is proved to be erroneous.

The Army Air Forces are making a magnificent combat record but we all must realize that we have a long bitter fight ahead of us. I want you to maintain your enthusiastic confidence in our purpose and methods. But only by greater effort, greater sacrifice and greater devotion to duty can we hasten the day of victory. Until that day arrives, let your work and your authorized spokesmen speak for you.



General, U. S. Army,
Commanding General,
Army Air Forces.

wounded the radio operator and sewed a seam of holes in the fin. The engineer, wounded in both legs, kept his guns firing short bursts as he cleared them of repeated jams.

Despite his wounds and loss of blood, the pilot remained at the controls and managed to dodge some of the enemy and to maneuver the plane so his gunners could get cracks at the others for more than forty minutes. In this time at least five of the enemy were destroyed.

Once Old 666 had dived to low altitude, the navigator ripped out the oxygen bottles and extinguished the flames. When the attack finally ended the co-pilot set the throttles and turned the controls over to the engineer who had told none of the crew of his own wounds. With only airspeed indicator and magnetic compass to guide him, the engineer flew Old 666 for an hour and a half while the co-pilot and the few uninjured members of the crew administered first aid to the others.

The radio operator, severely wounded in the neck, continued to secure bearings and brought the big plane home. On reaching the airdrome the co-pilot took over the controls and found it impossible to lower the flaps. He nevertheless brought her in.

It was her final landing—she was grounded after that—but Old 666 got down and rolled in gently to spare her wounded further pain.

Caterpillars

That old AAF fraternity known as the Caterpillar Club has been gaining a number of members who don't seem to understand the status of their membership. Letters have been dribbling into the desk of Lieut. Col. Falk Harmel (not a Caterpillar himself but a sort of ex officio historian of the lodge) at AAF Headquarters, requesting information on initiation fees, membership dues, certificates and the like. The letters have come from personnel who are qualified for membership through virtue of the compulsory use of their parachutes on at least one occasion.

Colonel Harmel asks us to notify all past, present and future Caterpillars that a compulsory—and successful—bail-out is all that is required for membership in the fraternity. There was a time when a commercial chute firm distributed gratis small metal buttons emblematic of membership in the Club, but this token has long been dispensed with. And quite properly, since the metal required to make up buttons for wartime members alone might be sufficient to put the finishing touches on the Axis—or at least a touch. The records show that the Caterpillar Club was founded in 1922 shortly after Lieut. Harold R. Harris made the first free parachute jump when the plane he was testing at McCook Field, Ohio, developed a structural defect. The name Caterpillar was selected because of the kindred spirit existing between the men who emerge with a sigh of relief from the silky folds of their chutes and the little worms that crawl into the light of day from cocoons.

Motor Transport

The men who drive the truck convoys and supply the essentials of war have hung up such a great record that we sometimes take them for granted. Two recent citations have come to our attention and we are glad to report them here. The first is a general citation for a Quartermaster Company Service group (Avn), a Quartermaster Company, Truck (Avn), and an Ordnance Company, MM (Avn), all of an Air Service Group in the 9th Air Force, who are commended for outstanding performance of duty during the period September 1 to November 15, 1942.

The citation reads: "During this period, these units by their untiring devotion to duty under the most trying conditions of the heat and sandstorms of the Egyptian desert made possible the active participation of the American Army Air Force units in the Middle East Theatre in the major battle then formulated. The preparation of our air forces in the major engagements during this period and their successes were made possible by the prompt and efficient manner in which these units were able to unload, segregate, transport, store and issue the supplies and equipment necessary for the conduct of operations. Motor transportation equipment was prepared for the use and possession of combat units under field conditions rendering such work virtually impossible. This task was performed night and day during excessive heat, sandstorms and most adverse conditions. These units are to be commended greatly for their exceptionally meritorious contribution to the conduct of operations against the enemy."

A citation from the commanding general of the North African Strategical Air Force for Capt. A. L. Zachry of Atlanta, Ga., for completion of a difficult and dangerous motor convoy mission in North Africa, had this to say: "In spite of great difficulties presented by strange roads, faulty maps, lack of a guide and the presence of enemy troops in the area, you led this convoy into the airdrome in time to supply our fighters with the gasoline and ammunition needed for the first day of our operation there. The major part of our victory played by the fighting unit operating from this airdrome would have been impossible without the supplies which your efforts delivered, and I wish to commend you highly for completion of a dangerous job in an expedient manner. Your actions reflect credit upon yourself and the military service."

"Dammit—I said incendiary BOMBS!"

—James T. Rawls

Hotel De Gink For Women

To accommodate WASPs who come through ferrying planes, and visiting WACs on equally serious purpose, a separate hotel for women has been placed across the street from the Officers' Club at Morris Field, Charlotte, N. C. Under the leadership of Mrs. Warner B. Gates, wife of the CO of the field, the women's club was furnished and is being maintained. The small building consists of a lounge and reading room and six bedrooms. Funds to establish this Hotel De Gink for women were raised through parties and war bond auctions. The place has been virtually filled since the day it was opened. The bill is fifty cents a night.

From the Staging Area

"Winged Victory" is the title of the official Army Air Forces stage show now having its dry runs under the personal direction of the author, Moss Hart. The play will test hop in Boston, November

1. Regular missions start in New York November 18 at the 44th Street Theatre. At the moment all major Hollywood studios are bidding for picture rights. The TO consists of a number of stage, screen and radio personalities in the AAF. Eighty percent of the feminine contingent will consist of wives of Air Corps men. Altogether the show will use over 300 soldiers and five revolving stages. There will be a mock-up of a B-17 on the stage which may or may not fly, depending upon the amount of type of fuel used —by the audience.

From Red to Blue

The red border enclosing the insignia for all United States military aircraft has been replaced with a blue border. It seems that the red border, caught at a flash in air action, sometimes resembled the Japanese insignia. Several months ago a new type of insignia was adopted for United States planes. It consisted of the white star in a circular field of blue, with a white rectangle attached horizontally at the right and left of the circle. Now the blue border encloses the entire device.

AAF Song Book

If it isn't already in your back pocket, a trip to the nearest PX should get you next to the song book of the Army Air Forces, just published and being made available to PXs in two editions, one pocket size and the other a piano edition.

"Air Corps Airs" is the title and it boasts 78 different songs—words and music—from traditional Air Corps numbers, written by AAF personnel, to popular ones. The pocket edition includes blank pages for the boys who like to write their own lyrics.

The book, only one of its kind, wouldn't look bad in the Christmas stockings of the folks back home. All profits from its sale will go to the Army Air Forces Aid Society.

Songs Away

THE stories are making the rounds about Capt. John Hunter Pitts, minstrel boy of the South Pacific who chases the Jap with ballad and bomb.

From what we hear, the latent talents of this heavy bomber pilot with the 13th Air Force first came to light on his initial hop over a Jap base. At that time he had never seen Zeros, never been in the searchlights nor experienced anti-aircraft fire. On this trip he got it all. When things were the hottest he made modest acknowledgement to the other planes on the mission.

"This is the radio program — 'I Was There' — starring John Hunter Pitts," he soberly announced.

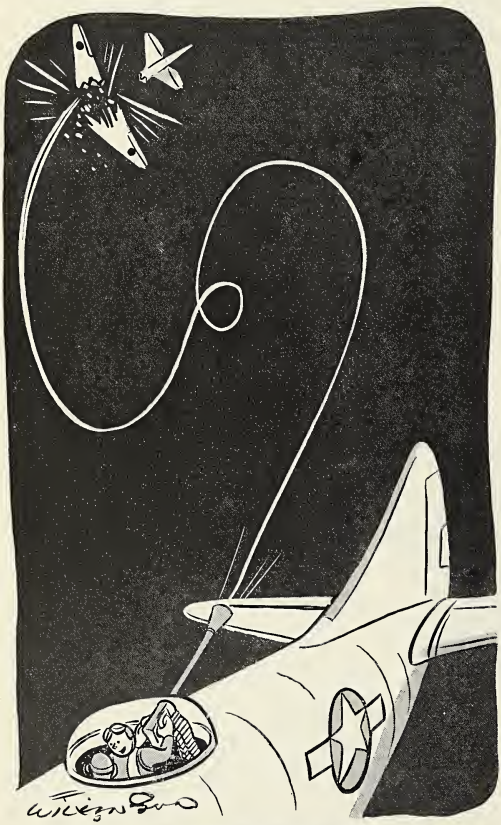
Another time, while going in for the bomb run, Captain Pitts' tail gunner shouted that a Jap searchlight had found the plane and was holding it in the beam. This, of course, came as no surprise to the captain who knew that ack-ack would soon be moving in on them. He believed, however, that he could complete the bombing run. "Wave at them then take a bow," Captain Pitts instructed the tail gunner. A few seconds later the bombs plastered the target and the big plane pulled away unhurt.

On unescorted harassing missions the captain favors his crew with a program of rousingly appropriate music, usually featuring his loud, baying parody: "Harassing we will go, harassing we will go! Heigh ho, the merrio, harassing we will go!"

After concluding a foray, and having sung himself into a state of appetite, the captain turns his attention to the inner man. Some sixty miles from home base he calls in to the cook.

"This is John Hunter Pitts returning," he says. "Please put the pancakes on."

At last report Captain Pitts, who hails from Phoenix, Ariz., had chalked up 70 combat missions and 403 combat hours. And that represents a lot of singing.



"I magnetize the bullets."
—FRITZ WILKINSON

No Box Tops

THERE will always be a lingering doubt that some radio announcers are not as exercised as they sound over their wares, although John N. Dunham, formerly with Station WBBM sold himself a well-known product. As the commercial announcer for the Air Corps recruiting campaign he lasted through six programs, then enlisted. Cadet Dunham is now in his final training phase at a two-engine pilot school.

Join the Party

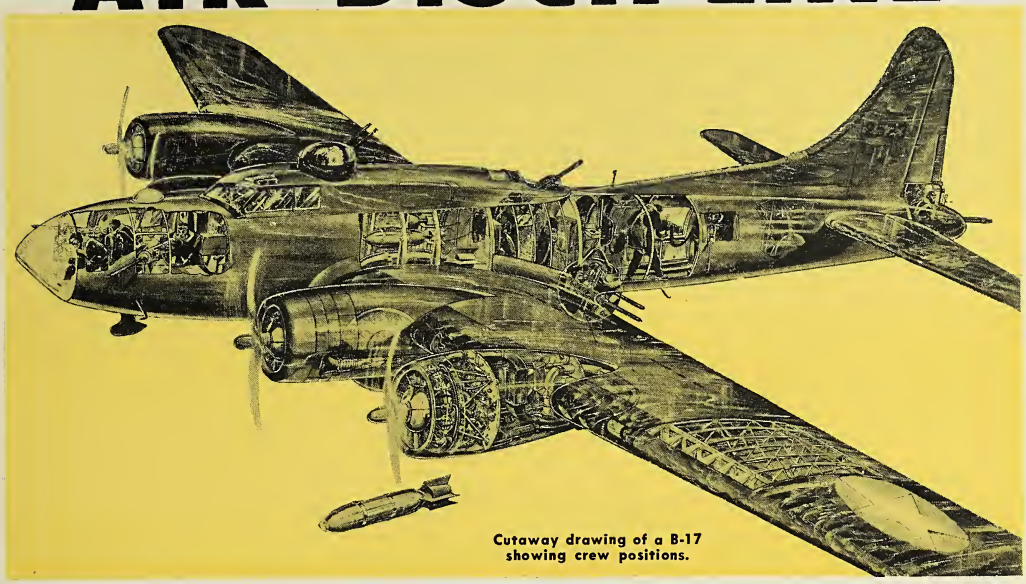
AAF men everywhere are invited to tune in on the annual Army-Notre Dame football rally to be held at the Hotel Commodore, New York City, on November 5, eve of the traditional game. The rally will be carried on a national hookup from 2100 to 2130 (EWT), and the time of broadcast to men overseas will be announced by short-wave two weeks before the event. This program will include special messages from ranking AAF officers and sport and stage celebrities. The Army Air Forces Aid Society will share in receipts of the rally.

Navigation Instructor's School

A NEW central instructor's school where rated aerial navigators will learn the technique of teaching navigation cadets has been established at Mather Field, Calif. This school is the first of its kind to give instructor training to navigators in the United States.

After completing the four-week course, instructors will be assigned to the navigation schools of the AAF Training Command to teach aviation cadets how to take the planes out and bring them back. Navigators who have been overseas will be brought up to date on recent developments, while the navigators as yet untried in combat will receive the benefit of the veterans' experience. —THE EDITOR

AIR DISCIPLINE



Cutaway drawing of a B-17 showing crew positions.

By Brig. Gen. Frank A. Armstrong, Jr.

Former Group CO, 8th Bomber Command

There are no Sunday rides on a bombing mission from England. You work every mile of the way.

It is often hard for new men to understand what lies before them in combat. They come to us like rookies from the minor leagues, wondering and sometimes grousing about the hard work and the discipline. Then they go into action.

Something very definite happens to a man once he has been in combat. The clown of the crew is still the clown, and the men are still full of excitement, but something has changed inside them. The missions seem to take on a new meaning. A deadly seriousness becomes apparent.

The first three missions are the hardest for every aircrew—like a team playing for the championship after weeks of practice games. For the first time the crew is on the spot. The team is confronted by a very real challenge, and has its first chance to prove that its equipment and training are good. The chance also is at hand to see just how good the enemy is.

And no matter how many combat hours a man stacks up, he learns something on every mission, something new and important, since no flights are alike. If he doesn't learn on each mission he had better stop flying and check himself before he stops through no choice of his own.

Of all the many factors involved, nothing is more important than air discipline.

Air discipline is more than a phrase. It is a form of conduct that has as its foundation the complete dependence of one crew member upon another, of plane upon plane, squadron upon squadron, group upon group. In its present wide-scale application it is something new in the military, an outgrowth of mass aerial attacks. It is a symbol of both offensive and defensive strength.

In combat you must have something more than good equipment, personal skill and the courage and will to fight.

Air discipline starts on the ground, with soldiering, and continues in ground school. It takes on new meaning when you first realize the practicality of obeying the rules of combat flying and the consequences of disobeying them. If you can't discipline a man on the ground you surely can't in the air.

Discipline in the air is the antithesis of the so-called tradition that flying is an independent, somewhat carefree, operation. In combat, the "wild blue yonder" is far less wild when men and planes stick together.

It is sometimes hard for young officers to grasp the meaning of air discipline. They feel they know their jobs, know their equipment, and have confidence in both. But let them knock around in combat with heavy bombers and they'll learn that good equipment and skill are not enough. And I will throw in courage and the will to fight for good measure. Something more is needed. That something we call air discipline.

Perhaps the first thing to be learned is that we are flying bombers and not fighter-bombers, no matter what you may read in the papers. Our aim is to get to the target, drop the maximum number of bombs, and get home again so we can prepare to drop more bombs. We fight through necessity, not through choice. Under no circumstances on a bombing mission do we leave our prescribed course to find enemy planes. There is not a man among us who wouldn't like to take every crack he can at the Hun. But our cracks

come in bombs. Bullets are only a means to an end.

Formation flying is air discipline applied. Its overall objective—maximum striking power with maximum protective power—is always the same. Its method of application is constantly in a state of flux. The enemy tries something new and we counter. When he switches his attack we're all set to change our defense. We can be likened to a catcher and an infield on the alert for a bunt.

We fly a fairly tight formation, but each bomber is assigned a block of air within which he may maneuver and alter his speed and altitude depending on the situation and the type of attack. It is vital that each pilot understand how much freedom he is allowed and how far he can go without stepping out of formation.

When a plane drops out, it not only jeopardizes its own position but takes twelve guns away from the formation. And when a plane is shot up and starts falling behind we have to let it go. We can't send more planes to stick with it. That would weaken our main effort. It's not easy to continue on your way when you see a ship drop out and know that enemy fighters swarm over a straggler like ants on a fallen sparrow. We do everything we possibly can to save every ship and bring them all back, but air discipline demands that we protect the group.

Knowing that we bomb as a group, the enemy tries to knock down the lead plane. He thinks that is his best bet. But to date the Hun has never turned back a formation. We don't turn back! And we don't jettison bombs—no matter what happens.

The lead bombardier sights for range and deflection and the other planes follow his run. But every bombardier in the formation sets the data in his bombsight. He must be ready to take over in the event something goes wrong with the lead plane or his own ship is knocked out of formation.

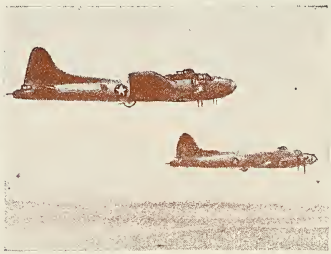
During a bombing run, when the success of the whole mission depends on what is accomplished in a two- or three-minute interval, there is no time for formality or for recognition of rank. When the bombardier takes over the ship for the run on the target he is in command. I don't care what the relative rank between pilot and bombardier, the bombardier tells the pilot what he wants done. And he doesn't stand on any of the niceties of military etiquette. The bombardier *tells* him.

There may be other occasions when the pilot is so guided by another man's judgment, when he virtually relinquishes command of the plane for a brief period. But the pilot is always the captain of the ship. And yet, except when some vital decision is to be made, it is seldom necessary for the captain to exert his authority. The authority is his and the men know it.

He is the man responsible for nine other lives and for an expensive piece of equipment. Pilots should always be on their way to becoming squadron COs, and I can't think of a more important job. The first prerequisite of a good CO is being so good as a pilot that the rest of the squadron trusts him implicitly.

A pilot can be a good CO and still be congenial, a regular guy. You can command respect from your men and yet live with them and be one of them. You can't be too lenient and you can't be too hard. Above everything, you must have their welfare at heart. When they know how you feel about them they will give you the maximum support.

That understanding between captain and crew is part and parcel of the relationship between one crew member and another, between a group of specialists pooling their efforts in a single job.



Every man on the plane should know the duties of every other man. I've seen a navigator and top-turret gunner bring a plane in together. The pilot was wounded and couldn't use his arms. The co-pilot was knocked out. So the navigator slipped into the co-pilot's seat and handled the controls; the top-turret gunner worked the throttles; the pilot gave them advice. Between the three of them, they brought the ship in.

Air discipline is essential in gunnery, for in a bomber it is necessary for every man, regardless of his position, to know how to handle the guns.

Gunners are instructed to cover certain fields of fire. This procedure is carefully worked out according to the place of the individual planes in the formation and is designed to bring the maximum number of guns to bear in every position. No matter how certain a gunner is of getting an enemy plane, no matter how badly he wants that plane, he must discipline himself not to swing his gun out of the line of fire he is instructed to cover. It may mean that he has to pass on a sure kill to another gunner, but, more important, it means protection against another enemy ship slipping in at an uncovered angle.

Each man should be proud of his own work and should feel he is an essential part of every operation. During the early days of our bombing missions over Europe, we showed the pictures of the results of bombing raids only to the pilots and bombardiers. But soon we realized that each member of our air and ground crews was a part of every raid and had a right to see the pictures. We posted photographs in squadron dayrooms. We displayed pictures of aerial combat, too. Now each man can view the results of his work, can profit by his errors and feel a personal satisfaction in a job well done.

Perhaps the best insurance for air discipline among crew members is the fact that a man who is undisciplined is unliked. Discipline and popularity go hand in hand, in a very practical way. An undisciplined man will fail to carry out his specific duties and will jeopardize the other members of the crew. And the other men know it.

Thus, discipline breeds comradeship, best illustrated, perhaps, in the talking that goes on over the interphone. And there should be plenty of interphone chatter, except when a vital piece of information is to be exchanged or when the plane is over the target. Not only is it good for morale but it serves as a means of keeping crewmen alert, as a check in determining whether crew members are all right, and as a quick method of relaying information on enemy fighter attacks and anti-aircraft fire.

To associate discipline with informality, comradeship, a leveling of rank, and at times a shift in actual command away from the leader, may seem paradoxical. Certainly, it isn't down the military groove, but it is discipline just the same—and the kind of discipline that brings success in the air.

I firmly believe that if you fly and fight intelligently—the way the people in the theatre teach you to fly—and if you observe air discipline, your only serious trouble will come through bad luck. You can be hit crossing the street when you're in the correct zone and the light is with you. It won't be your fault but it can happen. That, to me, comes under the heading of bad luck.

But a lot of so-called bad luck is due to lack of alertness—or a relaxing of air discipline. There can be no letdown over enemy territory, or even near home base on a return from a mission. Occasionally, when returning from long flights, we do what we can to make ourselves comfortable, such as dropping to an altitude where we can stop using oxygen. But in such cases, it is folly to relax. Combat crews must be disciplined to remain alert until they step from their ships on the home field.

Discipline in the air isn't easy. It means a long, hard grind all the way. But it means successful bombing, and no grind is too long and hard for that. ☆

'Poisonality'— A STRAGGLER

By FIRST LIEUT. JAMES J. MAGINNIS
8TH AIR FORCE

This is the story of a straggler as the pilot tells it—the routine operations report he turned in on the B-17 "Poisonality" which limped back to Britain after a raid on the Fiesler aircraft factories at Kassel, Germany. As mass daylight raids over the Continent continue, it is the type of story other pilots tell about stragglers—the bombers which are forced out of formation to return home on their own or go down fighting.—THE EDITOR.

We took off on a flight to Germany, flying in the second element of the high squadron of the high group in a three group combat wing. We formed and ascended without trouble and saw a few fighters and a little flak as we crossed the coast going in.

Things went well until forty minutes from the target when the manifold pressure on No. 4 engine suddenly dropped to twelve and stayed there. We manipulated turbo control, throttle, mixture, rpm and cowl flaps, but could get no rise from the turbo. It was quite evident that either the turbo regulator or the turbo itself was gone. The engine was left running since it wasn't holding us back too much, and a feathered engine is always an invitation to enemy fighters. We determined to reach the target so long as they didn't cause us to lose the formation.

At this time Sergeant McCurdy, the left waist gunner, reported that the flaps had crept down four to five inches. This was indicated in the cockpit but the flaps would not retract electrically. The waist gunner was ordered to crank them up and bind the handle in place. This was done, though the flaps remained slightly down.

We stayed with the formation on three engines until about ten minutes before the target when No. 4 engine began to throw oil and smoke very badly. At this point, we feathered it.

The target was reached OK and our bombs were dropped from close formation. With the help of Second Lieut. William J. Holloway, the navigator, the turns from the target and rally point were anticipated and utilized to keep us in close to the formation.

Right after the target we began totalling the gas and found the greatest amount was 95 gallons in No. 4 tank. It was evident we would have entirely too little gas to complete the mission as scheduled. Tech. Sgt. William A. Glenn, the top turret gunner, was ordered to transfer fuel from No. 4 to No. 1 tank since No. 1 was the lowest. He set the fuel transfer valves and pump but after fifteen minutes it was evident that no gas was leaving No. 4 tank. The pump fuse was checked and found OK. No hand transfer pump was installed.

It was necessary to use full power all the way out to stay with the formation in its evasive action against flak. When possible we climbed up into the high squadron on the inside of turns, and when necessary we dropped down into the lead or low squadron on the outside of turns.

Then as we approached the coast, No. 1 began cutting out for lack of gas causing us to drop behind the formation. We dove to try and catch the low squadron, and at this time I first heard the plane being peppered with bullets and shells. We could not catch the low squadron so I dove for the group below us.

An explosive shell hit the oxygen, throwing splinters into pilot and co-pilot, filling the cockpit with smoke and dust a starting a fire. Although not wounded, Lieutenant Holloway and Second Lieut. Edward C. Piech, the bombardier, were knocked down and stunned. The co-pilot put the fire out with a fire extinguisher. Simultaneously, the bomb bay doors swung open, the flaps went down one-third, and No. 1 engine stopped putting out and was feathered.

I started diving at 250-300 mph and over 6,000 feet per minute, taking evasive action, while heading for a layer of strato cumulus clouds at 5,000. Near the cloud layer, with No. 1 and No. 4 engines feathered, orders were given to prepare for ditching. In the cloud layer a course of 275 degrees was taken and soon No. 3 engine ran out of gas and was feathered. Altitude was lost to 3,000 feet, where we broke out below the cloud. The fighters had left us.

No. 4 engine was unfeathered and was found to put out full power but no turbo boost. Airspeed was kept at 110-120 to maintain 3,000 feet altitude. All preparations had been made for ditching. SOS's and QDM's were going out OK. Sergeant McCurdy, badly wounded, was in the radio room being treated.

We sighted the English coast about ten miles ahead. As we crossed the coast at 3,000 feet, No. 2 engine began to falter, and soon thereafter was feathered. That left No. 4 doing all the work.

A few miles inland we spotted an airport under construction. We examined the control cables and surfaces and found them satisfactory for any landing. The wheels were put down, and we stayed between the coast and airport so a ditching or beach landing could be made if wheels fully or partially failed to extend.

Two of the three runways had large obstructions on them but the third had only minor obstructions such as barrels and bales of wire. The wheels and tires were down and checked, so an approach was made with the crew in position for crash landing. The landing was made and immediately the right tire began to get flat. The ship was kept on the runway with left brake and No. 4 engine, the only unfeathered engine. About thirty gallons of gas were left in No. 4.

Perfect cooperation was achieved by the whole crew. Every man did his assigned job throughout and all obeyed orders quickly and accurately.

In the few minutes of running fight Sergeant Reeder, the tail gunner, shot down two enemy fighters; Sergeant Long, the ball turret gunner, shot down another, and Sergeant McCurdy a fourth after he had received his mortal wound. ☆

Lieutenant Maginnis' report is fairly complete, but it does not reveal that "Poisonality" was so badly shot up by enemy fighters that it could not be repaired. It does not say that everything movable in the B-17 was jettisoned and that besides the fatally-wounded left waist gunner four other members of the crew, including Lieutenant Maginnis, were struck by 20 mm shell fragments. The others were Second Lieut. Roy H. Peterson, co-pilot; Sgt. Daniel J. Reeder, tail gunner, and Sgt. Angelo J. Riccardi, right waist gunner. Other crew members not previously mentioned by name were Tech. Sgt. William A. Harvey, radio operator, and Staff Sgt. Verl P. Long, ball turret gunner.—THE EDITOR.


ATTACK

ON PLOESTI

At a base in North Africa several months ago, Maj. Gen. Lewis Brereton, commanding general of the 9th U. S. Air Force, called together his group commanders, leaders and deputy leaders. It was more than just an ordinary meeting. The talk he gave them might well be called one of the most significant of the war. General Brereton said, in part:

"As most of you know, the 9th U. S. Air Force has been charged with the destruction of the Rumanian oil refineries . . .

"This task will be accomplished by one zero altitude attack with every B-24 that can fly to Ploesti and return . . .

"German armies on the Russian front and the German and Italian armies fighting our own troops in Italy are almost entirely dependent upon Rumanian oil . . .

"The sudden, complete and permanent denial of Rumanian oil will inevitably result in the collapse of German hope for a successful offensive against Russia and a successful defense against our invasion of Italy . . .

"The complete destruction of Rumanian oil refineries this month, with follow-up attacks against other related objectives, might well bring an end to the European war six months to a year earlier than can otherwise be anticipated . . .

"Time is of the essence. We must do this job now that Germany has committed her troops to an offensive in Russia and a vigorous defensive in Italy . . .

"The piecemeal destruction of the Rumanian refineries will not have the desired effect. Destruction must be complete and final. Our force, led by you men, must sweep clean the Rumanian oil industry.

"You have been assigned a task that could not be accomplished by a dozen ground divisions in a period of months. You men must do the job virtually in one day . . .

"No more important task has been ever assigned one striking force."

On these and following pages AIR FORCE presents information on various factors of the Ploesti mission, illustrated by photographs taken during the attack from the low-flying bombers. —*THE EDITOR.*

PLANNING THE MISSION

By Col. J. E. SMART
HEADQUARTERS, ARMY AIR FORCES

THE Ploesti attack, carried out by 177 B-24s on August 1, differed from other operations in many particulars. Most significant, perhaps, is the fact that heavy bombardment aircraft were employed to make zero-altitude precision attacks upon well-defended objectives. But it is also significant that the operation was conceived and planned in detail in Headquarters, Army Air Forces, rather than in the field, as is normally the case. Its subsequent development had the assistance of agencies of the 8th Air Force, the 9th Air Force and the RAF.

Thus, while the commanding general, 9th Air Force, alone was responsible for its conduct, the mission had the fullest possible degree of preparation from both intelligence and training aspects.

A history of the operation begins many months ago.

Allied industrial experts knew well the vital points and bottlenecks of Axis fuel production and refining. The Ploesti area of Rumania loomed large in their calculations. There—around the cities of Ploesti itself, around Campina, twenty miles to the northwest, and Brazil, five miles south—were located that nation's major oil refineries. This area refined all Rumanian crude oil—approximately a third of the total used by the Axis. It also accounted for all the Rumanian cracking capacity.

High-lighted by flames and silhouetted against the dense smoke, a B-24 (left) flies low over the burning Astra Romana Orien refinery during the Ploesti attack.

General Arnold's staff drew up a plan envisaging the destruction of these refineries by a low-level attack involving B-24 type aircraft based in North Africa.

The plan was then presented to the Combined Chiefs of Staff. After obtaining the views and recommendations of the commanding general, Allied Forces, Mediterranean Theatre of Operations, they directed that the proposed operation be carried out at such time as to interfere least with the invasion of Sicily and permit adequate training and preparation. It was further directed that two B-24 groups based in the United Kingdom and one in the United States be sent to the Mediterranean theatre for participation in the raid.

Conduct of the operations was assigned to the commanding general of the 9th Air Force.

While the original plan designated a low-level attack, the planning and operational members of General Brereton's staff made a further study. They examined the possibilities of both high and low-level attack. They estimated the relative degrees of success that might be expected, the probable and possible losses, and the predictable advantages of both.

General Brereton, after considering this data, decided that the initial attack would be made at low level with all available aircraft.

Following this decision, there were assembled in the 9th Air Force specialists in intelligence, low-level operations, weather, communications, navigation, material, armor and armament peculiar to the B-24, draftsmen, artists, architects and other personnel.

THE Commanding General, Army Air Forces, prepared the broad, basic plan; collected and prepared intelligence data, especially that obtained from petroleum technicians with first-hand knowledge of Ploesti targets; studied the availability of forces and consequent loss to other undertakings by diversion of personnel; arranged for the manufacture, procurement and shipment of low-altitude bombing sights with mount for B-24 aircraft; ordered the procurement and shipment of special delay action fuzes; transferred certain specialist personnel, and handled the procurement and transfer of sufficient aircraft and combat crews to bring each of five groups up to their required strength.

To the overseas commands went responsibility for execution of specific training and supplemental intelligence functions.

Much credit for success of the raid must go to the 8th Air Force and the RAF.

It was the commanding general, 8th Air Force, who conducted tests to demonstrate the practicability of the low-level attack en masse.

The flying technique finally decided upon for the mission was largely shaped by the results of those tests.

Further, the commanding general, 8th Air Force, trained in low-level bombing all combat crew personnel of one bombardment wing, prepared target folders, aids to navigation and other material.

The Chief of Air Staff, RAF, made available all intelligence and operational personnel and facilities of the Air Ministry, constructed scale models of the Ploesti targets and vicinity, helped in the making of motion pictures for the briefing of crews, and provided mechanical aids to navigation for some of our aircraft.

The RAF in the Middle East assigned operational and intelligence specialists, assisted in the briefing and indoctrination of crews, and furnished data on the enemy's use of smoke screens and other

Bombers head home, leaving the blazing refineries behind.

factors affecting success of the mission.

Among the functions of the 9th Bomber Command were the adaption of detailed plans for bomb loading; the drawing up of routes to and from the target, the approach, attack, withdrawal, timing and related tasks; the construction of dummy scale targets and the conduct of simulated coordinated attacks against them; the supervision of all training; the instruction of crews, and the distribution of target and briefing data.

THESE vast preparations, quickly described, took months for actual accomplishment. Even when the B-24 groups were completely equipped and assembled in North Africa, there were arduous days of training, days in which crews learned to fly their heavy ships just a few feet off the ground for miles and miles, to acquire navigational skill to find and bomb life-size dummy targets with a rare degree of coordination and accuracy.

Clearly, the B-24 was not designed for extremely low work. The crews, however, practiced bombing the dummy installations until no more than sixty seconds elapsed from the time the first bomb dropped by the first plane hit the target until the last one from the last plane struck.

August 1 was chosen as D-Day and the attack was carried out in accordance with Field Order No. 58 of the 9th Bomber Command.

One hundred and seventy-seven B-24s departed from their base. They flew a route designed from the standpoint of both direction and height to avoid all known enemy detecting devices. The height varied, of course. At times the ships were at an altitude of 10,000 feet. But the approach to the Ploesti area and the actual bombings were made at tree-top levels which can only be appreciated by examination of photos taken on the mission.

It should be emphasized here that the intelligence data furnished at Headquarters and other commands proved highly accurate. Furthermore, where photographs were not available, artists had drawn pictures of the target and of points along the route which pilots and navigators found extremely helpful.

Despite this, some trouble was encountered. Col. Jack Wood, for example, led one group of B-24s against Campina. This group of refineries lay in a valley with a slope toward the southeast. The plan was for his planes to come in for a downhill run from northwest to southeast. He was supposed to fly low up one valley, hop a ridge, turn down another valley and hit the target.

Upon arrival at the base of the mountains, he found the tops of the mountains covered with clouds, which made it difficult to find recognition points. He picked a likely looking valley, made his run and went over the ridge. He found it was the wrong ridge.

Wood then turned, flew his planes back up another valley and made a second run. This time they found the target and completely wiped it out.

Other planes from other groups had similar difficulties. Our losses on the raid were quite high. Nonetheless, of the 177 aircraft departing their base, an impressive number reached the target, attacked it with devastating force and wrought a destruction so enormous that it must seriously impair the working of the Axis military machine.

'. . . Conspicuous Gallantry'

The Medal of Honor has been awarded to two colonels who led separate elements in the August 1 attack on Ploesti, marking the first time this nation's highest award has gone to two participants in the same military mission. The recipients of the Medal are Col. Leon W. Johnson of Moline, Kan., and Col. John R. Kane of Shreveport, La., who were cited for almost parallel acts of valor.

While proceeding to their targets on this 2,400-mile raid both elements led by Colonels Johnson and Kane became separated from leading units in the low-level attack when they encountered dangerous cumulus cloud formations over mountainous territory. Though temporarily lost, both colonels later brought their elements into contact and continued to the targets, completing their attacks without the advantage of surprise upon which the success and safety of the mission largely depended. Both officers carried out their attacks in the face of thoroughly alerted defenses, destructive anti-aircraft fire, enemy fighter planes and the imminent danger of exploding delayed-action bombs dropped by the previous element, oil fires and explosions and intense smoke which obscured the targets.

"By his gallant courage, brilliant leadership and superior flying skill," the citation read, "Colonel Johnson led his formation as to totally destroy the important refining plants and installations which were the object of his mission. Colonel Johnson's personal contribution to the success of this historic raid and the conspicuous gallantry in action and intrepidity at the risk of his life above and beyond the call of duty demonstrated by him on this occasion constitute such deeds of valor and distinguished service as have during our nation's history formed the finest traditions of our armed forces."

Colonel Kane's citation read: "By his gallant courage, brilliant leadership and superior flying skill he and the formation under his command successfully attacked this vast refinery so essential to our enemies' war effort.

"Through his conspicuous gallantry in this most hazardous action against the enemy and by his intrepidity at the risk of his life above and beyond the call of duty Colonel Kane personally contributed vitally to the success of this daring mission and thereby rendered most distinguished service in the furtherance of the defeat of our enemies."

OVER THE TARGET

By Capt. JOHN S. YOUNG
9TH AIR FORCE

YOU might say that the Ploesti oil refineries in Rumania were destroyed on the African desert, long before the real raid.

The actual attack on August 1 was only the continuation of a rehearsal which began six weeks earlier at our advanced bases in North Africa. A routine announcement was made that 177 B-24s would fly 2,400 miles for a low altitude precision attack. Our target: Ploesti's cracking, distillation and power plants.

We had already helped chase Rommel across Africa. Ours had been the first outfit to bomb Italy. We had hit Greece and Crete and we had hunted convoys all over the Mediterranean. But this raid was going to be different.

On previous missions, we had bombed whatever we could find. We had gone out with general instructions to find Rommel and give him hell. When we hit the European mainland, we had made a lot of saturation raids. But for the Ploesti mission, every plane in every element was given a pinpoint—and we had to find it. There were no secondary targets. Col. John R. (Killer) Kane, our group CO, was not being dramatic when he said, "Either we hit Ploesti or we'll die trying."

We examined hundreds of still photographs. We saw motion pictures taken from the air before the war, showing us exactly what the area would look like from our bombers. We attended lectures given by a former manager of one of the Ploesti plants. And we had a detailed relief map of the surrounding territory, complete with roads and even trees. Finally, a miniature model of the targets, drawn and constructed to an exact scale, was laid out on the desert and we practice bombed it for weeks.

We ran approximately twelve missions over that replica of the oil fields, approaching, attacking and departing exactly as we intended doing on the actual raid. Each element was given a specific dummy target which had been erected to resemble the real thing, and we practiced until we could bomb it in our sleep. When we finally did get over the real Ploesti, our movements were almost automatic. In a low altitude raid, you have to know precisely where you are going because you don't see your target until you are on top of it. And we knew we could only make one pass.

OUR Liberators were modified considerably for the mission. An extra releasable fuel tank was added in the bomb bay. The top turret guns in the lead planes were arranged so that they would fire forward, so the first ships could strafe the entire area, with the following planes protecting their rear. Extra fifties were mounted in the noses of the lead planes.

Five bomb groups made the raid. Colonel Kane and I were piloting the lead ship of the first element. The second group was on our right wing, a third on the left, another further to the left, and the fifth on the extreme left. We flew a flat V, wing tip to wing tip—no plane in the entire formation was more than 25 feet away from another plane.

We had forty-eight planes in our element, flying in sections of five. The first four sections had ten planes each, with an eight-plane section bringing up the rear. Each of the first twenty ships carried 1,000-pound bombs with sixty-minute delayed action fuzes. The sixty-minute fuzes were a precaution against premature explosions damaging the last planes over the target. In practice bombings, we got the entire flight across the target within a minute and fifteen seconds, but we were prepared for the possibility that some ships might get lost on the way and reach the target late. Each plane in the last three elements carried 500-pounders with 45-second delayed action fuzes.

Weather conditions were perfect when we took off at 0710. We crossed the Mediterranean at 2,000 feet. At our initial point we ran into thick cumulus clouds at 10,000 feet and lowering. Over Yugoslavia, the clouds started settling in and we had only about 1,000 feet of visibility over the 9,500-foot mountains. As we came into the Danube Valley, we dropped down to 2,500 feet and followed the Danube River to our target.

All the way across the Mediterranean and over part of occupied Europe, we

With storage tanks ablaze in background, bombers pass over cracking unit furnaces (A) and fractionating columns (B).

ATTACK ON PLOESTI

Smoke pots fired by the enemy obscured some of the targets.

didn't even see an enemy plane. It was like a practice mission but, naturally, we maintained radio silence. In that long ride, I don't think anybody said a word.

About 35 minutes from our target, we lowered to twenty feet off the ground. And I mean twenty feet. We were coming in so low our plane actually had to pull up to avoid hitting a man on a horse. That horse probably is still running.

The fun started when we spotted a freight train sided at a railroad junction. There must have been fifty cars full of oil just inviting our personal attention. Tech. Sgt. Fred Leard, our right waist gunner, and Sergeant Weckessler, top turret gunner, were mighty eager boys. They called Colonel Kane on the interphone and asked if they could "test" their guns. They had gone through a routine test just after we left the field and everything was in proper working order. But they wanted to make sure, and if a German oil train was sitting beneath them—well, that was just coincidental. The Colonel, never a man to object to a "routine" check, gave his approval and the "test" began.

All the other gunners decided that their guns needed a check, too—just to make sure they were working. It probably marked the first time in history that a routine gun inspection resulted in a Nazi train being blown right off its tracks.

About two miles from the target, the flak guns bellowed out a reception comparable to none I had seen in 330 combat hours against some heavily defended targets. Most of it was 20 mm stuff, with some 40 mm and a lot of machine guns. The fire was plenty accurate.

A mile and a half from the refineries, we opened up with our fifties aiming at the oil tanks which held about 55,000 gallons of oil. They started to explode, throwing smoke and flames about 500 feet into the air. There we were, buzzing in at twenty feet, doing 200 miles per hour, flying through intensive flak and bouncing around between oil fires. Play that on your harmonica sometime.

Our particular targets were the Orion and Astra Romana refineries. They had smoke stacks about 210 feet high, so we had to climb to about 250 feet to drop our bombs. Flames were biting in through the bomb bay doors, the heavy smoke fires made visibility difficult, and the flak fire was beating a hellish tattoo all over our ship, but with all the practice under our belt we had no difficulty picking out our targets. We laid our bombs down the middle.

Forty of the 48 planes in our element got over the target. One cracked up on the take-off and seven others turned back with mechanical troubles. The rest of us didn't miss.

After the bombs were away, we dropped back to twenty feet and about fifty ME-109s and 110s jumped on us from the right. We were flying so low they couldn't dive on us, but they did lazy eights all over our formation and caused us plenty of trouble.

The housing around the propeller and three cylinders of our No. 4 engine were shot out. Two feet of the prop on the No. 1 engine was smashed, tearing a foot and a half hole in the left aileron. The motor was vibrating like a bucking bronco. And we had a wing cell leak in No. 3. We (I say "we" because Colonel Kane and I were both flying that airplane) put on ten degrees of flaps—no more. Ten degrees gives you the best lift without creating too much drag. We kept our wings straight by using the rudder, not the ailerons. Use of ailerons under those conditions is liable to drag a wing down.

We were still at twenty feet—maybe less. As a matter of fact, Lieut. R. B. Hubbard, our radio operator, called Colonel Kane and suggested that we get some altitude because we were collecting a mess of branches, leaves and cornstalks. The colonel investigated and I'll be damned if Hubbard didn't hand him a cornstalk!

The fighters kept coming in and we accounted for three. They attacked for about twenty minutes, and we just put the ship on the ground and ran like hell.

We muddled through the fighter attack, and staggered away from the target on two and a half engines. About 200 miles south of the refineries, we realized that we couldn't return over the Mediterranean with our battered ship. We decided to hug a land route going back. The chief topic of conversation was picking a good place to set her down. Everybody was pestering our navigator, Lieut. Norman Whalen. For my money he's the best in the business. He finally had to tell the colonel, "Look, if you guys will just leave me alone for awhile, maybe I'll find a field." We left him alone. Whalen was navigating for two other damaged planes which were following, and the three of us were being covered by Lieut. Royden LeBrecht. Nothing had happened to his ship.

We crossed an enemy airfield at 1,500 feet and the flak batteries opened up. I don't know who was more surprised. But we got away without trouble.

In order to gain altitude to cross a mountain range, we threw out everything that was movable. We released the extra gasoline tank and tossed out oxygen bottles, gas masks, ammunition, radio equipment and anything that a screwdriver could dismantle. I haven't yet seen the humor in LeBrecht's remark, but he called and inquired: "What the hell are you doing, redecorating?"

We finally got up to 6,600 feet, but we needed 7,000 feet to cross the mountains. By picking our way through canyons and ravines, and with some lucky updrafts, we managed to get over.

A portion of the flaming Colombia refinery, showing the boiler house (A) and power house (B).

The plane was hobbling along now at 130 miles per hour and we knew that it might stall around 125 mph. It was still flying, however, and we kept plugging along. We had a choice of putting her down on land or flying across open water to the nearest Allied landing field. The colonel and I realized that there was a good chance the ship would flop into the water, but we had come too far to worry about that. As we crossed the coast, Whelan gave us an ETA of 2110 for the selected airfield.

Whelan was on the nose to within a minute. Exactly fourteen hours and forty minutes after we left Africa, we let her down.

We had to crash land the plane, but nobody was hurt and the first thing I did after we got away from the ship was to kiss the navigator. Yes, I really kissed him.

A couple of days later we got back to our original base where Major Selvey had a dove and pheasant dinner waiting for us. Major Selvey is group materiel officer, and I suppose he figured that the banquet came under his department.

After the experience, I think I am in position to offer some advice to men who may go on a similar raid. The most important thing for you to do is learn formation flying to perfection. Even with a heavy bomber, you must be able to stay no more than 25 feet away from your wing man. You've probably been told before about flying tight formations. In combat, you do it or you don't come back.

Don't be afraid to hug the earth. A B-24 will fly ten feet off the ground and you'll find real safety down there. Practice evasive tactics until they come out of your ears. When the enemy peashooters attack, keep in a turn, increasing and decreasing that turn, and stay on the ground. Whatever you do, don't fly in a straight line. When a fighter climbs after his first pass, he has to look for you all over again. If you are flying straight, he'll be able to pick you out very easily.

All aerial engineers should practice the EXACT procedure for transferring gasoline. That can't be over-stressed. I think we lost a couple of planes on our raid due to the difficulty in making the proper transfer. Get rid of the gas in your bomb bay tanks as quickly as possible and transfer it to the wing tanks to avoid having a chance hit in the bomb bay blow you up.

When we returned I was asked the extent of damage we did to the Ploesti refineries. Naturally, that's hard to figure, but I can speak first hand of our particular targets, the Orion and Astra Romana refineries. The boys in our element agree that no German oil will come from them for quite some time. ☆

'Mission Accomplished'

The Plaesti missian praved ance again that American bombers can carry out precision attacks on remate and seemingly invulnerable targets with the accuracy of a skilled surgean guiding his knife.

Each bamb dropped had a particular address. The exact targets were selected meticulausly, after manths af planning, far their relative importance. The number af planes assigned ta each individual target was gauged in propartion ta its size and importance.

The refineries at which our airmen struck were in three graups—at Plaesti, at Campina and at Brazil. There are about forty refineries in the Ploesti area, of which two-thirds are obsolete and unimportant and were discarded as targets. Our main forces were cancentrated an the large refineries and other installations in Ploesti, while other planes were dispersed ta the plants an the autskirts.

Our planes singled out their abjectives one by one and pulverized them with the precision af rifle fire.

The largest of the Ploesti refineries was the Astra Ramana, impartant because af its large praductian af gasaline, ane-third af all Rumania's productian cracking praccesses. It is alsa the central receiving station for ail from mast af the ather refineries. It pumps all oil maved ta the Giurgiu terminal af the pipeline on the Danube, over which it is moved ta Germany.

We damaged its powerhause sufficiently to put it out af aperatian, demalished its cracking installatian and destroyed almost half its operational capacity.

The Steaua Ramana refinery at Campina is a very modern plant with the mast madern distillatian equipment. It was wiped out.

We wiped out most af the vital parts of the Creditul Minier, which had large madern cracking equipment and an impartant aviation gasaline plant. It was erected anly last year.

The Calambia refinery had a considerable prapartion of cracking equipment. We destrayed mast af its vital parts and cut its operational capacity in half.

Half af the Phaenix Orian plant was obliterated.

These are but some of the plants we hit. Damage was wraught elsewhere. The bambs dropped included many of the delayed actian type and it is certain that their detonations caused further havoc.

The effect of this missian an the German war effart cannat be immediately apparent. It must shaw in the vast curtailment of an essential saurce af the European Axis' ail supply, and in the enarmous burden placed on the Axis transpartatian system. The latter invalves the necessity af hauling crude ail fram the Rumanian fields ta refining plants far distant fram the fields, and rehauling the refined praduct in many instances all the way back ta Germany's Eastern frant, to which the surviving refineries are not nearly so handy.

The effect must shaw in a strain thraughaut the entire German war machine through depletian af a vital resource, and in an ill-afforded burden af an extra handling aperatian impased on the already overloaded rail transportation system.

PREPARE FOR INSPECTION

ADMINISTRATIVE • COMMUNICATION • TACTICAL • TECHNICAL

TIMELY ADVICE FROM THE AIR INSPECTOR

Matters presented here are informative only, and are not to be considered as directives.

WELL DRESSED FIGHTING MEN: What the well dressed soldier will wear overseas depends on you inspectors at showdown inspections after warning orders are issued in this country. Here are some points to keep in mind when checking clothing and equipment:

Trousers: Fair wear will usually show up at the bottom and back of legs, edge of pockets, fly or seat. Hold the trousers up to the light to check wear.

Coats: Be sure to look at the cuffs, edges of pockets and buttonholes.

Field Jackets: Inspect cuffs and collars at folds. Hold the cuffs and collars in both hands and apply pressure to determine serviceability.

Shirts: Check for frayed collars, and worn buttonholes, cuffs and elbows.

Shoes: Look over soles and heels, back stay, counter and insole. Close scrutiny will often reveal that the slip sole is torn away from the welt or that the back stay is split on the insole.

Leggins: Check for broken eyelets and worn straps, and stitching pulled out along seams.

Raincoats and Overshoes: Inspect for holes, cracks, cuts and the like. Look particularly for snaps that have pulled loose from the rubber or fabric.

Mess Gear: Be sure that the hook on the meat can cover is intact.

Field Equipment: Check buckles, snaps, straps and stitching.

TRAINING AIDS: Two publications which should bear the imprints of frequent thumbing by S-3s in the field are FM 21-6 and FM 21-7. The first is entitled "List of Publications for Training," and the second, "List of Training Films, Film Strips, and Film Bulletins."

The United States Army has the world's finest training aids, and it is up to S-3s to know what they are and to put them in service. To help S-3s with this work, The Air Inspector recommends a chart showing what manuals have been issued to organizations and activities, and how many additional ones are needed.

UNUSED EQUIPMENT: Inspectors, when you see crates of idle equipment stored in a warehouse, start asking questions. What is it? What is it used for? If you can't get the answers, open the crates. The equipment may be something that should be utilized on your base—or at another station. Purposes for which bases were designed sometimes change, and equipment for one type of organization no longer serviced may be merely gathering dust.

LIVE WIRE SIGNAL MEN: Add to reasons why Americans are defeating the Axis: The signal company of a service group starting its training at a western base had not yet received its switchboard. The company wanted to set up telephone service for the group *now*, so its commanding officer talked to the Base Signal Officer. Parts of a switchbooard—many of them old and badly worn—began to materialize from base supplies and from cast-off equipment of the local telephone company. After repairing the worn parts, the signal men put the various pieces together and soon had in operation an exchange that provided both service and training facilities. The best training, however, came from putting the switchboard together. The organization is now overseas with a new switchboard, and you can bet it will take a direct bomb hit to put it out of commission permanently.

GOOD-BYE, PETS: Overseas movement orders mean a parting of the ways for an organization and its mascot—duck, dog, cub bear or what have you. Don't show up at the port of embarkation with a spaniel wagging its tail among the luggage. Port officials have enough to do without disposing of assorted animals and fowl, not to mention pet goldfish.

PROTECTING MONEY OVERSEAS: Going overseas, soldier? Here is some information you will want on postal money orders when purchasing them for the protection of your personal funds:

Just have the postal money order drawn payable to a relative or to yourself at the United States post office at your home address or that of the relative. You can then hold the order for a year and still get it repaid to yourself as remitter at your APO or any other APO branch of the same United States post office. At any time, however, you can send the money order to the relative to whom it was originally made payable. If the order is issued showing you as payee also but is drawn on the post office at your home address in the United States, you can indorse it over to anyone you wish residing at the office on which the order is drawn. It can be cashed there for a period of one year from the last day of the month in which issued (WD Circ. 155, 1943).

GETTING TO THE BOTTOM OF SHOE PROBLEMS: Your feet are the ones that will hurt, soldier, not those of the inspector, if you arrive overseas with a pair of shoes having bad soles. Don't try to "get by" the inspector.

Some of you men lining up for show-

down inspections wear brightly polished shoes that are not serviceable and should be replaced. The shoes may on occasion be passed over by the inspecting officer, but fortunately for him he will not have to wear them. Although they feel comfortable on your feet now, they may worry you more than the enemy in rough country overseas.

AR 615-40 states that company or unit commanders will require squad leaders to make weekly inspections of shoes. But that doesn't mean that each man shouldn't check his own shoes daily.

Aids to keeping shoes in shape:

Frequent polishing.

Regular application of properly prepared lubricants (dubbin).

Avoidance of drying by direct contact with heat.

So far as practicable permitting natural drying.

No single pair of shoes should be worn on consecutive days. Alternate with a second pair.

Sleeve Patches Aid Inspectors: Inspectors, you now have a new aid in checking on malassignment of enlisted technical specialists. We are talking, of course, about the distinctive sleeve patches of men in job classifications of armament, communications, engineering, photography and weather, which are authorized by AAF Regulation 35-12.

Each man receives six patches to be worn on the outside sleeve of the coat, field jacket and shirt (when worn without the coat), and on the left breast pocket of the fatigue uniform. By noticing the sleeve patches of men at work on a base, the inspector can often tell at a glance whether they are properly assigned.

Overseas, these patches are particularly valuable as men can be picked quickly for jobs when rush calls are received.

Bomber Teamwork: "If it weren't for the tail gunner using the interphone to keep me posted on the formation behind, the top gunner reporting to me what he can see, the ball turret gunner telling me what he can see, it would be almost impossible for me to fly the airplane in combat. I can't get up and look around. Those fellows are my eyes."

In these words, Capt Robert K. Morgan, a pilot with a record of 25 successful bombing missions, pointed out the importance of teamwork for a bomber

☆ INSPECTING THE INSPECTOR

Are you checking to see that all references to "limited service" are deleted from service records of men retained on active service? (WD Cir. 161, 1943.)

☆ ☆ ☆

Do you know whether service records are accompanying all enlisted men transferred from your organization or station?

Is everything possible being done to speed up the submission of shortage lists in preparation for overseas movement?

☆ ☆ ☆

Do you give credit where it is due?

☆ ☆ ☆

Are you checking to see that long distance calls are being held to the minimum?

AID FOR ALERTED UNITS

In keeping with his policy of passing on to other commands valuable practices observed in the course of inspections, The Air Inspector presents here an outline of the assistance program for alerted units organized by the base administrative inspector at Bradley Field, Conn.

To assist the base commander in carrying out his responsibilities to an alerted tactical unit, the base administrative inspector's office brings to the unit commanding officer advice and personnel aid whenever necessary.

Immediately upon learning that a unit has been alerted, an inspection is conducted to determine the status of the organization as regards training, supply, personnel, morale, etc. This might be called a preliminary POM inspection. Action is started to bring into play all the members of the base staff who can assist in preparing the unit for overseas movement. Such showdown inspections called for by warning or movement orders are made with the aid of the base S-4 and Quartermaster. Other base officers are expected to take the initiative in providing aid, with the work coordinated by the base administrative inspector to assure that all details outlined in POM are covered.

Accuracy of the records of the individual soldier is stressed, since any future benefits which may be due himself or his beneficiaries depend largely on those records. A special questionnaire covering some thirty points on personnel matters aids in checking and correcting service records and allied papers.

Dissemination of clothing and equipment lists makes the conduct of a complete showdown and preparation of shortage lists a much simpler and more accurate task. Displaying of marking posters in barracks speeds the accurate marking of individual clothing and equipment.

Of special aid to inspecting officers are loose-leaf binders (6 by 9 inches) containing extracts of pertinent regulations

and directives, maintained up-to-date and indexed for ready reference.

The base administrative inspector considers it a personal obligation to lift the morale of the enlisted man to the highest degree. The organization's furlough list is reviewed with the unit commanding officer, and men with overdue furloughs, especially those stationed a considerable distance from their homes, are encouraged to obtain the privilege of a trip home prior to overseas movement. Where time is short and distance is long, with monetary conditions permitting, the base administrative inspector recommends that the transportation office issue priorities for commercial airline travel.

In the final stages of an alerted unit's preparations, prior to the troop movement, the administrative inspector's office assists the organization by following through with the transportation department on the dispatching of household goods and boxing, crating and marking of equipment. The actual handling of the troop movement—consultation with the Traffic Control Division, Washington, D. C., set up of kitchen cars, etc.—is supervised by the administrative inspector's office to assure 100 per cent base cooperation.

Considered vitally important are the following general points:

Don't be cold and aloof when inspecting a unit. Close cooperation is needed from all concerned, and a highly critical attitude will not attain this result.

Maintain a genuine interest in the unit's welfare.

Be liberal with advice, but be sure it is based on information that is accurate and up-to-date.

Stimulate interest by individual contact, wherever possible, with the enlisted man actually making entries in records.

Don't be stingy with your time and energy, and each alerted unit which leaves your field will be confident and cheerful with the knowledge that everything humanly possible was done to bring the unit to a high state of efficiency.

☆ HERE ARE THE ANSWERS

Q. Can rebuilt shoes be taken overseas?

A. If the inspector at the showdown inspection decides the shoes are serviceable, they will go overseas. However, if they are found to be unserviceable, only Class A shoes will be issued as replacements (Par. 12c, AR 615-40).

☆ ☆ ☆

Q. Does the requirement that the Individual Pay Record (Form 28) reflect up-to-date accurate pay data at all times mean that entries must be made for each monthly payment?

A. No. The reference to "up-to-date" pay data means that all entries on Page 2 and 3 of the form will be accurate and complete. Only "casual payments" made to enlisted men while absent from their organizations need be entered in the form. Casual payments include partial payments or payments for a month or months made to enlisted men where separated from their organizations. It is no longer required that entry be made of the last payment to enlisted men preceding their transfer to another command (Letter, Headquarters, AAF, 1 July 1943).

☆ ☆ ☆

Q. Does the reference in POM to the removal or obliteration of insignia before departure for a concentration area, a staging area or a port refer to the AAF shoulder patch?

A. No. The shoulder patch remains. The directive refers to unit organizational insignia, not to Army Air Forces insignia.

Q. Can an Army exchange call upon the post engineer to render services?

A. Yes. When materials, supplies or equipment have been furnished, the exchange will pay promptly by check to the post engineer for the actual cost thereof, including cost of services (AGO WD Memo W210-17-43).

☆ ☆ ☆

Q. What happens to athletic and recreational equipment purchased from WEMA funds when an organization is ordered overseas?

A. It is turned in to the nearest post, camp or station prior to departure for a port of embarkation staging area (Memo S210-9-43, ASF, Office of The Adjutant General, 17 May 1943).

☆ ☆ ☆

Q. If there is a conflict between POM and the overseas movement order, which governs?

A. The movement order. POM is considered a part of the movement order.

crew. Tactical inspectors cannot emphasize this point too much. Working together on the interphone is only one phase of the necessary teamwork of a crew. Inspectors should check to be sure that crew members are becoming familiar with all jobs on a bomber.

Dividends in Bomber Raids: Technical inspectors, have you ever stopped to think when you read that 50 American bombers attacked a target in the Ruhr Valley or the Solomons that only 45 might have made that raid if you had not been doing your job? Or that 55 bombers might have participated in the raid if you had done a better job?

First and second echelon maintenance on planes and engines often pays dividends months later in combat.

This is just to remind you that too much stress cannot be placed on maintenance inspections—preflight, daily, 25- and 50-hour, etc.

104th Article of War: If you are stumped on some question regarding punishment under the 104th Article of War, look up AAF Memo 35-6, 17 July 1943. This memorandum discusses in detail the "do's and don't's" of punishment.

Pack Them Together: "Keep the parts of sets together in packing cases."

You will be glad you heeded this advice when you get overseas and start to assemble such items as an M1937 range. If the repair kit, the pans and the stove are in different cases, you may have a hot meal and you may not. Packing cases sometimes become widely separated on the trip between the States and battle zones.

Pass the Ammunition: In making ordnance inspections, here are some points to be checked:

Are oldest lots of ammunition being issued first?

Are sufficient copies of AR 775-10 available in the organization and are they being used?

Are excess stocks of ammunition on hand, and if so, what has been done to eliminate them? They should be reported to the next higher headquarters for disposition.

Is every effort being made to salvage used cartridge cases, links and packing boxes? The salvaged items should be turned into the base ordnance officer for disposition. They should not be allowed to accumulate in the armament shop. ☆

Camera Acrobatics

Although gremlins are too quick to be caught by the camera, this shutter was fast enough to show what they might do to a turning prop. Believe it or not, this is a Hamilton Standard three-blade hydromatic propeller with aluminum alloy blades of conventional type.

The explanation is not a cyclonic gale that bent the blades like tree limbs. The effect is simply the result of a trick camera shot at Wright Field.

The picture of the propeller, which was turning counter-clockwise, was taken with a focal-plane shutter which exposed the image on the film from the bottom of the picture toward the top.

During the time the shutter slit or opening travelled completely across the picture, the propeller had turned through a considerable portion, probably one third, of a complete turn (120 degrees). In moving from the bottom to the top of the picture, the shutter opening first exposed the image of the tip of the lower blade in the lower left hand corner. As the shutter opening moved towards the center of the picture it continued exposing successive portions of the lower blade in positions more and more counter-clockwise.

When the shutter opening was in a position to expose the center of the picture it happened that the middle blade (in the picture) was horizontal and parallel to the slot. Hence the middle blade was exposed almost simultaneously throughout its entire length and did not move for during its brief exposure. It therefore appears practically straight.

The exposure of the image of the top blade started at the hub when the blade was to the right of center. As the shutter opening moved upward, the top blade moved counter-clockwise so that by the time the opening got to the top of the picture the image of the tip of the blade had moved into the upper lefthand corner of the picture. Intermediate portions of the blade were photographed in correspondingly intermediate radial and circular positions outward and counter-clockwise. ☆

DESTRUCTION BY PARACHUTE IN NEW GUINEA

As the battle in central New Guinea neared a climax, parachutes were playing their part in the Allied offensive. For the first time in the Southwest Pacific theatre, American paratroopers were dropped behind enemy lines to block the retreating Jap forces in the vicinity of Lae. Jumps were made successfully from a lower altitude than had ever before been attempted in such a combat maneuver. At the same time, other parachutes were falling on enemy airdromes—these supporting fragmentation bombs which blasted enemy aircraft on the ground and wrought havoc with base installations. Using this and other methods of low-level attack, American bombers were pounding Jap airfields with such regularity that the enemy defenders on the ground were almost completely without air support. In one attack on four airdromes in the Wewak area, more than 225 Jap planes were caught on the ground, many of them wing-to-wing; 120 were destroyed and a number of others severely damaged.

Dangling from these chutes are fragmentation bombs, aimed at Jap planes caught on the ground at an airfield in the Wewak area. Bombers come in at tree-top level in raids of this type.

These chutes carry paratroopers and supplies dropped behind enemy lines near Lae. The smokescreen in the background conceals the operation from the Japs. Note the two AAF transports at upper left, which have unloaded their passengers in a string behind them.

BOMBS FOR PARAMUSHIRU

By Majors LOUIS C. BLAU and FRANK T. GASH
11TH AIR FORCE

How our Aleutian-based bombers drew first blood against the Jap stronghold on the northern approach to Tokyo.

ILLUSTRATED BY
CAPT. RAYMOND CREEKMORE

MAJOR BLAU was a co-pilot on the first mission against Paramushiru and led a flight on the second. Major Gash was a flight leader on the second mission.—THE EDITOR.

WHAT impressed everybody most about Paramushiru was the size of the targets.

Month after month we had bombed a thin rim of pinpoint targets around the curve of Kiska Harbor, but the army staging area on Paramushiru and the naval base on Shimushu Islands were duck soup. If your stick overshot a warehouse, it plunked right down in the middle of a barracks area. You could hardly miss hitting something.

When we first learned we were to take a crack at Paramushiru we were still so busy bombing Kiska that there was little time to make any special preparations. It was to be just another mission. The plan was to bomb Kiska on the way over, take on some more bombs at Attu, and after bombing Paramushiru, drop another load on Kiska on the way back. In that way we wouldn't waste any time or gasoline.

Our information about the island that was supposed to be a Japanese Gibraltar, guarding the northern approach to Tokyo, was meager. As a result, our first mission was for reconnaissance as much as anything else.

Still, there was an extra thrill in that take-off from Attu on July 19. The distance on the course plotted for the trip and return was only about 1,700 miles, not far as missions in the Aleutian area go. Whatever qualms we had over the lack of emergency landing spots between Attu and Paramushiru were compensated for by the thought that we were carrying the offensive to the enemy. It was our first crack at the Jap in his native haunts.

Our Liberators, loaded with 500-pound bombs, were in command of Maj. Robert E. Speer. The weather on the way over was mostly hazy, although occasionally it cleared to CAVU. We kept to about 3,000 feet and then climbed to about 12,000 as we approached the Kamchatka Peninsula. The peninsula is mountainous, somewhat like the Aleutians, but quite wooded. We rubbed our eyes at seeing a tree, some of us for the first time in a year. After following the coastline for awhile, we cut off for our run to the target.

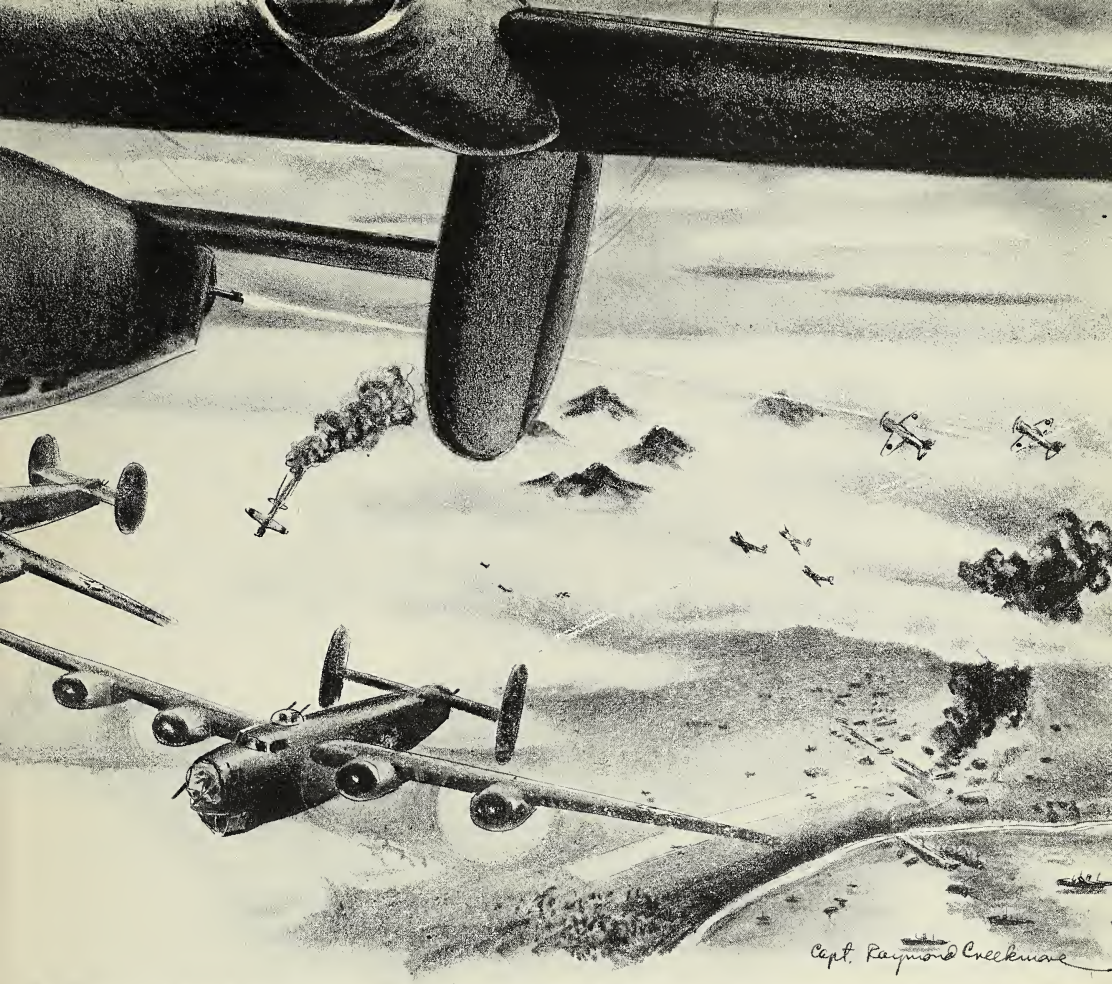
THIS first visit apparently was a complete surprise for the Japs. There was not a plane in the sky; none were even seen until after our bombing runs had been completed. Apparently not even the anti-aircraft was on the alert, because only four or five bursts were seen. Either they didn't have any more anti-aircraft set up or the crews were out for coffee.

As we approached, the clouds became broken and when we got over the target area visibility was good except for a low-lying haze which obscured the effect of the explosions. However, many excellent photographs were obtained and some smoke could be seen by the rear gunners.

One flight of three ships made a run at 18,000 feet attacking buildings in the vicinity of the airdrome near Kataoka. Another flight, through a misunderstanding of signals, dropped none of its bombs on the first run but had plenty of time to get away its entire load on a second run at about 17,000 feet, concentrating on shipping in the strait.

Many fishing and naval vessels and eight or nine large transports were observed in the strait. Several bombs were seen to drop close to these vessels, one of them scoring a near miss on a transport.

It was all over in less time than it takes to describe it. As we headed back home, five single-engine pursuit planes climbed up to intercept and two of about twenty float planes observed on Lake Bettobu, east of the naval base on Shimushu, got



off the water but their heart apparently wasn't in it. They gave up the chase within two or three minutes. The mission returned to Attu without a single bullet hole or so much as a scratch from anti-aircraft fire.

Our reception on the next trip, three weeks later, was quite different, to put it mildly. We bombed Kiska on our way over to the jumping off spot in the afternoon and everybody spent most of the night checking guns, motors, bomb racks and the thousand and one things that have to be looked after on any mission. We had a hunch the Japs might be waiting for us a second time.

With the aid of photographs obtained on the first mission we had a much better idea of our objectives when we took off through the early morning mist on August 11. In "A" flight were planes piloted by Major Gash, Lieut. Jerome J. Jones and Lieut. James R. Pottenger. Their target was the Kataoka naval base on Shimushu Island.

Making up "B" flight were planes piloted by Major Blau, Lieut. Robert Kammerer and Lieut. Robert Lockwood. Their target was the army staging area along the west coast of Kashawabara Bay. The planes of "C" flight were piloted by Capt. Irvin L. Wadlington, Capt. Harrell R. Hoffman and Lieut. Leon A. Smith. Their objective was shipping in Paramushiru Strait.

We cut down on the gas so each plane could carry a heavier bomb load. "A" and "B" flights also carried incendiary clusters.

Weather was CAVU most of the way over to the Kamchatka coast. We flew from 10,000 to 12,000, climbing to 18,500 as we turned south.

When we reached the tip of Kamchatka we found that both Paramushiru and Shimushu were overcast with a top of about 2,000 to 2,500 feet so we circled down to make a dead-reckoning run. After checking all stations over the interphone and finding everybody ready to go, all three elements headed for the target. Then we got a break.

The run is less than ten minutes. As we approached, the overcast became broken and we could see that over the targets the sky was clear enough to make a bombsight run as originally planned.

Then the No. 2 supercharger of Lieutenant Lockwood's plane went haywire and the No. 4 engine cut off altogether. He managed to feather the prop on his No. 4 engine but started to lag behind the other two ships of his flight. After coming all that distance, however, he didn't want to turn back without dropping his load, so he advised his flight leader he would keep course and make the best speed possible.

The second visit (Continued on Page 55)

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LAST MATCH

By First Lieut. DAVID W. SMALLWOOD

As Told to Capt. Allen C. Rankin, Jr.
Headquarters, AAFEFTC, Maxwell Field

A MAN doesn't think much of his undershirt until it saves his life.

Mine under my flight jacket was cotton, the same kind I had bought for years back in my home town of Oxford, Miss. Besides, this undershirt was worn out and I gave it less than no thought at all as our B-18A lifted from the runway and dropped Anchorage, Alaska.

So long, Anchorage! We grinned from ear to ear—Lieut. Oscar Cook in the pilot's seat, myself beside him as co-pilot and the crew huddling exuberantly together in the rear. So we were going to escape, were we, if but momentarily, from Alaska's green firs, its white ice and deep blue water—and its silence? We thought we were.

I had put the memory of a year in the Aleutians and the vivid mental picture of two bomber crashes behind me. Now, I thought about nothing but getting home.

All day our two ships, being ferried back in exchange for new ones, held their formation. Like two geese, we roared along over waste and water and ice in a dead straight line for home.

More of the same the next day. It was bright noon and we still roared along, Maj. Kenneth Northermar piloting the head ship and we sticking dead on his tail. Suddenly our ship lurched.

Major Northermar's voice snapped into our radio: "Your wing's on fire." The rest happened quickly. Fire wrapped the wing—and the wing was full of gas—then the right motor conked out.

"We're gonna have to go," said Cook, wrestling with the controls. Through drawn lips he said, "I'll tell you when to tell 'em to go."

I ran back in the ship's belly and checked the chutes. The men were standing at the open door, ready.

Cook fought to get the ship over land before he let them go. He was trying to make an island off Prince of Wales.

"Now," he said. I gave them the high sign and we no longer had a crew. Cook and I scrambled out the top hatch and jumped together.

As my chute jerked open I saw my friend whiz down in front of me. I watched him until he disappeared behind a mountain. I don't know whether he was hit by the ship or not, or if he ever pulled his ripcord, but the chute didn't open. Later, I found that four crew members had met death on striking the icewater; that only the ship's engineer and I had survived.

That blue icewater was coming up fast, and the wind was taking me farther out from land. To land in the water was death. I dumped my chute hard on the land side and fell as far as I dared. Then I let the chute fill again, and hoped.

I hadn't hit in the water. My face was smashed and my back sprained. I was dangling by my chute from the top of two tall fir trees. Just dangling. It was a long way down. I knew if I kept swinging up there I'd freeze so I unbuckled my straps and let go.

Snow broke the fall and I bogged down waist deep in it. I knew I should do something but it hurt too much to move. I finally crawled under a tree and stayed there. Two hours must have passed before I got my bearings.

I knew I would freeze if I didn't get up and exercise, and keep exercising. There was a sheet of ice on my flight jacket. I groped for my emergency kit, then remembered my fingers had been too cold to get it off the chute in the tree.

The watch on my wrist said 12:20. It had stopped when I hit.

I struggled toward the beach.

Then I knew why I couldn't see. I was being blasted by a snow storm. I had to find shelter. My head was clearing.

I stumbled upon a dead tree which had fallen across a ravine, making a dry burrow. I crawled in and tried to build a fire.

Boy Scout tricks failed. The letters I took from my pocket for kindling wouldn't catch in the damp leaves. Desperately, I struck match after match.

When only one match was left, I pocketed it for possible future use and went on exercising, waiting.

I was on the beach. I didn't know how long I'd been there. It seemed ages. It must have been almost midnight when the storm abated. All I could think of was the pain in my back. But I kept moving around as much as I could. I had to. I don't know why, but I had one little tune in my mind and it stuck. I went on whistling it into the icy wind. "Ninety-Nine Miles from Home . . . Ninety-Nine Miles from Home."

I sat down to rest.

Terrified, I realized I had dozed off just for a moment. The "twack" of a drove of ducks hitting the water nearby had awakened me. I stood up, knowing I must not sit down again. I went on exercising.

I could hear a boat whistle. The thought that somewhere down the beach the boat might be looking for me gave me hope.

Suddenly the cutter came around the point, with lights on its decks and a big searchlight swinging in toward shore and combing the mountains behind me. I screamed at it until I no longer had a voice, but I could tell the boat was slipping past, leaving me.

Then I got the idea. As the boat turned to clear the point, I ripped down my outside clothing and snatched off my undershirt. I bent over that crumpled bit of cotton, my stiff fingers holding the last match. I struck it and the tiny flame flickered.

Then it caught the cotton and flared like a bonfire as I waved the shirt. You never saw a prettier blaze than that!

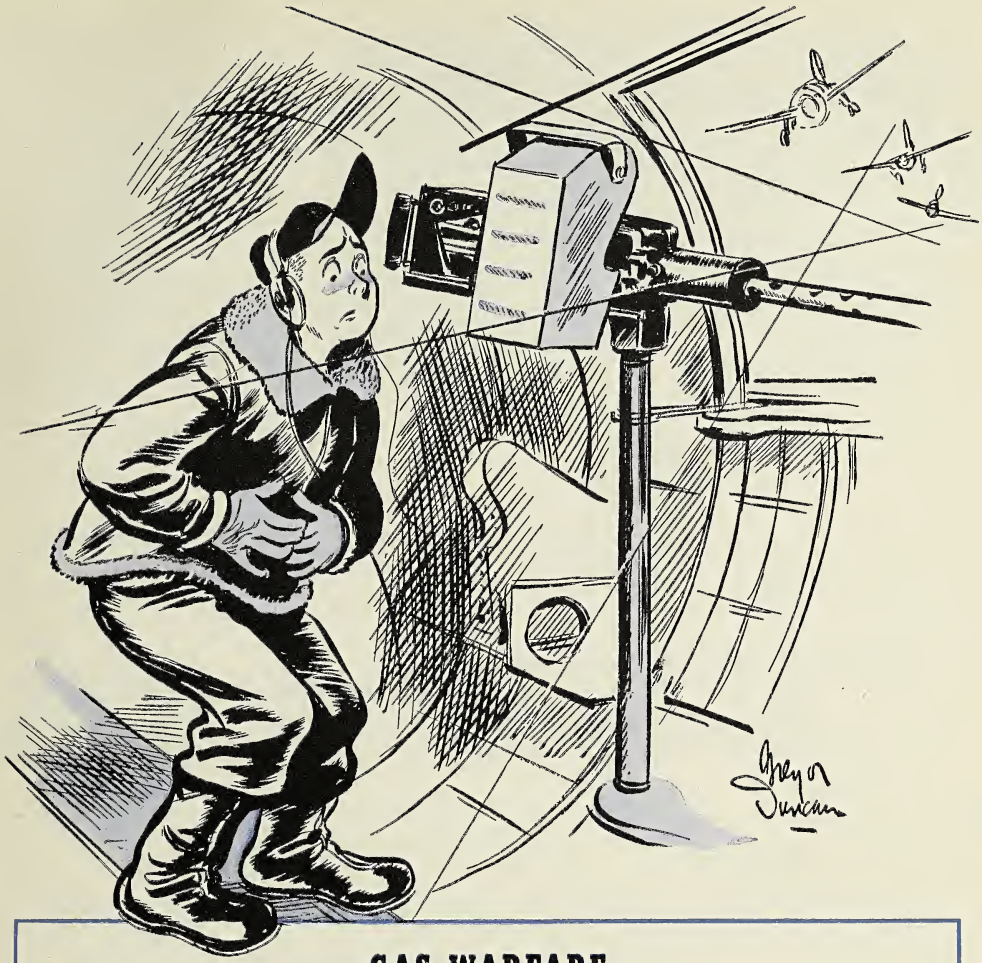
I was still waving when the searchlight turned slowly, deliberately, and pinned me in the middle of its shaft.

I sat down when the light hit me. All the strength went out of me and I flopped. I could hear the ship's dory being lowered from the cutter to come get me. I knew I was saved.

That was last February 8. For a long time after that, I thawed out in a string of general hospitals. When I got out, I went into a clothing store and bought some underwear.

I didn't just say: "Gimme four pairs of those things."

I said: "Gimme four pairs of UNDERWEAR . . . Cotton . . . Mississippi Cotton . . . the kind that'll burn." ☆



GAS WARFARE

Gas attacks aren't confined to land operations. For example, Olly, the waist gunner, is suffering from the high altitude variety—abdominal cramps—from something he et, no doubt. Must have been that strudel he had last night. Strudel doesn't like Olly.

But if strudel disagrees with Olly at ground level, it's bound to make him about ten times more uncomfortable at 30,000 feet.

Gas expands at high altitudes, and gaseous distress is also severely increased by a rapid rate of ascent. Cramps are unpleasant and painful, but if your immediate concern is a Zero at eight o'clock, they can be dangerous.

The important thing is to avoid the most notorious of the gas-forming foods, such as dried beans, cooked cabbage, onions and the like. Remember the foods which cause you trouble and if possible eliminate them from your diet prior to a high altitude mission.

Olly's problem is strudel. Who knows? In your case it may be Egg Foo Yung. Make a note of it.

(Third of a series by the Flight Control Command.)

OCS—

THIS is not a rebuttal. It is a direct result of the article "Look Proud Mister—You're at OCS" which appeared in the May, 1943 issue of AIR FORCE, and it was further impelled by the months of living and working with graduates of the Miami Beach school. The unfamiliar, dark-sounding term "bracing," the stories of formal retreats, the hours of standing at rigid attention beneath the Florida sun, the precise agony of preparing a hotel room for an all-comprehensive inspection, were so in variance with the routine of our OCS in Australia that this article was as natural as a newly dug slit trench after a surprise raid.

The original article, written by a graduate of the Miami Beach School, wandered into our palm-roofed native hut in New Guinea one day in July. It was raining again, meaning that the ceiling was down to the grass of the revetment area, the long dirt strip was heavy with mud, and the metal fighter strip was deceptively smooth with a thin layer of earth and water. Weather ships were flashing back reports that it was going to be that kind of day—a day for work in the shops, for a detailed study of news reports, for a hand in the floating poker game that was certain to crop up again in the late afternoon or early evening.

That article in the May AIR FORCE held a definite interest for a member of the first class of the Officer Candidate School in Australia. The contrasts invited comparison. Magazines describing the Miami Beach school had always been in demand among the candidates from Down Under, because all of us had been fascinated by the hotels, the traditions and the bracing, the countless platoons drawn up for formation, and the nearness of Miami itself to air-conditioned clubs and sweeping beaches.

Miami vs. Camp X. A brilliant resort against a new camp in a forest near an Australian city. Luxury hotels and real mattresses against small huts and mattress-bare canvas cots. Thirty-six platoons at Miami, graduating before a grandstand of wives and relatives and friends, against one bob-tailed platoon marching across a dusty road to a hasty graduation before an audience of twenty civilians, the faculty and a few men of the camp who were free of duty that morning.

Illustrated by James T. Rawls

The first graduating class of our OCS held a few hundred men, representing all arms of the service of the Army and Air Corps in Australia and New Guinea. They had come from Port Moresby, Darwin, Sydney, Brisbane, Buna and all the remote fields and outposts of the Allied forces. They had come by air across the Coral Sea and by various types of ships down the coast, by truck over the highways of Australia and by the rattling trains that cut over and through the miles of mountainous coast. Singly, by threes and fours, wearing freshly-creased khakis and worn coveralls, they had straggled in until it was past the deadline. The school, scheduled to open on January 1, held its orientation day on the third, and the late arrivals had been given the privilege of attending extra classes to bring their work up-to-date.

Spit and polish at Miami, in the tradition of the line outfits, came in the form of forced compromise at Camp X, although the lack of laundry service was modified by the old army tradition of GI soap, brush and muscle. The fifty-pound limit on airborne baggage weakened the orthodox stand, for it limited the number of uniforms (if the man possessed a number of uniforms) against the articles the man did not care to risk to slower transportation. There was, of course, no compromise with neatness, promptness and obedience of the rules set forth in the blue booklet of regulations. The rules were there in black and white, open showers were available as a laundry, and boot polish was one of the few items on sale at the understocked PX. It was not all knife-edge trousers and crisply done shirts, but the morning formations were spruce and alert in the cool hour after dawn.

Men in the Air Corps platoon added up to interesting contrasts. There was one out of the Philippines, evacuated first to Java for duty in the rear gunner's cockpit of a dive bomber. Two others had been in the Java show before going to Australia. A bombardier out of a medium bomb outfit was there for the first formation. He had flown from Hawaii and had been in tightly calculated raids over Lae and Salamaua before their names were even faintly familiar to the people at home. Another, educated in a famous old New England prep school and in France and at Oxford, had come the long way from first experience in the Volunteer Ambulance Corps of Finland through a long siege in New Guinea to reach the new school. In the rear rank a long,

Australia

By Lieut. W. F. HOUHA

Communications Officer with an Attack Group in the South Pacific

The first AAF officer candidates in the school Down Under led a double life with the Infantry, Engineers and Field Artillery.

lanky, sardonic technical sergeant—without stripes—stood like a dark guidon. He had been with the British for eight months in 1941 on an educational mission with P-40s, in Egypt, Syria, Iraq, China, aboard the Clipper in the Philippines and Hawaii thirty days before war came. Beside him were two engineers, line chiefs out of fighter squadrons at Darwin, remembering their nine months in that far outpost of dust and heat and raids. There was a radio man in the formation, wearing old khakis not improved by hours of sitting on the floor of a stripped down transport as it bucked its way through storms over the Coral Sea. He had been at Milne Bay for four months and he was deeply impressed by the brown dust of Camp X. There hadn't been any dust at that humid, rain-soaked tip of New Guinea.

The platoon held sergeant-majors, first sergeants, engineers, bombardiers, armorers, radio men—one with 3,000 hours in the big ships—personnel men out of the big headquarters, supply sergeants. And even a basic, whose total freedom from technical training and an even cleaner record in the Panama infantry had caused sorrow to the statistical officers of the Air Corps when they first tried to place the square peg in the round hole. The men came out of service groups, fighter squadrons, medium and heavy bombardment outfits, from isolated units operating independently in a vacuum and from units under the critical eye of the commander in chief. They covered the Air Corps like Joseph's cloak.

We formed in the rain, that first morning, marched across the road onto the parade ground and sat down on persistently wet grass to listen to the orientation speeches by the colonels, majors and captains—the officers who had been assigned the duty of training us to become officers. The Air Corps platoon felt out of place in that company with no familiar, reassuring silver wings in sight. The crossed rifles of the Infantry, the cannon of the Artillery, the colorful flags of the Signal Corps and the Ordnance bomb—but no wings. The colonel made a careful effort to welcome the section, but when all eyes turned to appraise critically, the eight ball lifted its shadow.

The brief introductions told us that it was to be a twelve-week course, divided equally between basic and specialized training. It was expected that all men would conform without difficulty to the rigorous routine since the average length of service indicated that experience had fitted them for the correct drill, courtesy and discipline demanded by the school. The faculty was to proceed on the premise that the candidates were soldiers, qualified not only by past training but by actual service in the fields of maneuvers and combat. The fact that a good percentage had returned from forward areas was to permit no relaxing influence on the discipline of the school.

Brief, clear—leaving no room for misinterpretation.

The six weeks of basic began with thirty long minutes of physical drill. The entire student body worked out before an uncompromising instructor who machine-gunned the drill with speed and precision and, we thought, an unwarranted premeditation. It hurt, because New Guinea and the Northern Territory, with months of field rations, dawn pre-flights and night stand-byes, had not been conducive to top physical condition. The familiar black-out effect of the tropics threatened to end that half hour prematurely for a few, but they steadied against the giddiness and held on. They had come too far to permit losing out in the beginning.

Rifle drill, military courtesy and discipline, military law, map reading and aerial photography, mess management, chemical warfare, company administration, symbols. Disciplinary drill on the narrow company road. The high-pitched pleading of the second lieutenant of Infantry, out of Panama, assigned as our platoon commander, to remember that we were not in the Air Corps for those six weeks, but in the Infantry. To remember the look of deep agony on his face when one of us would call the "squadron" to attention, instead of the "squad," is sheer pleasure, now that it's all over.

We had a split life down there. We lived and drilled with the Infantry and the Engineers, and attended class with the Field Artillery. It meant that the major of Artillery would make reference to batteries and battalions, and the Air Corps candidates would commit the unforgivable by translating the terms into their equivalents of flights and squadrons. On those five-mile hikes through the marshes and over the sudden hills of the surrounding forest, carrying a map board, coordinate square and ruler, the long-legged major walked the class into the ground. "I want the grid coordinates of this culvert, gentlemen," he would say striding along while your half-empty canteen nudged the hip suggestively, with two hours of the Australian tropical summer heat ahead.

There was Judo and bayonet drill, brawling in the dust of the barrack area, learning the fine art of killing with civilized efficiency and extreme dispatch. Night problems in scouting and patrolling were interspersed with those sessions on a hillside at midnight. With an immense open plain as the stage, we listened to the invisible instructor lecture on time-distance, on the correct method of cutting through wire emplacements. We listened for the sound of muffled cutting tools, for the sound of a rifle bolt as it was drawn quietly and for the instructor who would ask: "A thousand yards? Five hundred? How many men are coming through the wire?" We watched, grimly fascinated, as a guard walked post and a silent figure, visible for a brief instant in the shadowy beam of a flashlight, stepped high and softly in the tall grass to go into precise motion, hitting hard and whipping a length of slender cord around the guard's neck and ankles.

We advanced through the woods of Hill 200, against the waiting snipers, invisible against the foliage in their perfectly blended jungle suits, and felt the familiar quickening of the heart again, as if the off-beat of the enemy bombers, or the sudden, shattering sound of strafing planes was near. We went for cover

when the engineers blasted a deep set charge to send rocks and splinters in a cascading shower over a hundred yard area. They gave us shovels and picks, and taught us the exact art of digging a dive trench. To most of us, that was really gilding the lily. If there was a job to be done, they saw to it that it was our job.

It wasn't easy, not even for the Infantry veterans of the Buna campaign. But no alibis were accepted and none were given. The man called out of ranks to handle his squad or platoon was expected to whip out commands with clear authority and decision. If he was given the order to instruct for ten minutes on an intricate phase of the Manual of Arms, a ranking officer was there, studying his voice, manner and confidence. The man who faced his squad into the sun during a brief lecture, the man who showed indecision in a crowded drill area—these were the men marked down for a later meeting with the Board. We did have the Board, as part of our tradition.

THE school made its mark. The instructors drilled unceasingly upon the need to conquer the assigned subjects, not only to earn the coveted commission but to gain the confidence so necessary to instruct the men an officer had to command. It was the Infantry speaking, but to all of us it was the Old Army. The Old Army that has always been a gigantic school, steadily pushing a difficult curriculum against a vital need. The instructors made us alive to the fact that as officers we had to know men and had to be capable of accepting responsibility with assurance and accuracy of judgment. It was a big order. It all could have been defined with one word: Responsibility.

It wasn't all work, of course. The faculty recognized the need for a break in the routine and permitted freedom from 1700 hours Saturday to 1900 hours Sunday. This ruling was subject, through an unusual provision in the school regulations, to rescinding at the discretion of the CO. Our first three Sundays were spent pacifying the Old Man's wish that a road be built through the area—with a bridge where it was needed—and that an obstacle course be engineered in a remote section of the camp to further plague the candidates. After those jobs were completed, the Sundays were free. Unless a man was fortunate enough to pull a Saturday night guard.

A free half day was granted on alternate weeks to allow the men to go into town for necessary purchases. The half day permitted candidates to make the fifteen-mile, transportationless (unless one considered the shyly hesitant 1:38 train) journey to town in time to hurtle into a pub minutes before the last ounce of beer drained out of the kegs, to get a meal in a crowded restaurant, to make reservations for the Saturday night cinema, and to shop without hope in the stores that had so little to offer after three years of war. The streets of the big town were filled with service men and service women. Sailors. Air Corps men on leave from the North. Australian WAAFS. Diggers with triangular patches on their hats of the famous upturned brims, showing that they were veterans of the returned A.I.F. from Tobruk and the Middle East. Sailors from a Free French destroyer, very Gallic in immaculate white shorts and shirts, gesticulating sharply as they paraded through the crowds. The stolid jungle green uniforms of the Dutch, so amazingly heavy for the tropical sun. MPs and the Navy's Shore Patrol, walking easily, swinging short clubs and tolerantly ordering celebrants to button up that shirt, to fix that tie.

The blue OCS badge brought on questioning, for it had not been there before. What did it mean? What outfit was you guys with? When did you get over from the States? We offered the modestly satisfying reply to all street and pub questioners that we were members of the newly formed Overseas Cargo Service, that we had just arrived from the States, and that we were returning Tuesday weather permitting.

The first six weeks went swiftly after the first week, with its initial shock of drill, discipline and endless lectures, had finally come to an end. The tempo of the drill increased. The morning physicals began to take on a snap and precision that brought a grudging gleam of approval to the critical eyes of the line officers who invariably happened to be standing by as the Air Corps went through the morning drill. The weary afternoons of rifle dry runs, of lying in the dust with the sun beating heavily down and an instructor walking behind the line, prodding: "Get those heels down, bring that elbow under, get that strap clear up to the armpit and your thumb across the stock," finally led to a full day on the range and the good feel of the jar of the rifle flowing through the arm. There are not many satisfactions as great as watching the marker come up to cover the black circle.

We had no ceremony, of course, when the second half of the course began for there was no senior class. We were given one farewell speech, when the colonel of Field Artillery put away the last field manual, leaned on the tiny rostrum and said: "We of the Field Artillery have enjoyed having the Air Corps with us for these past six weeks. You have been good students and soldiers. If you ever want to transfer to a real outfit, the Field Artillery will be very glad to have you."

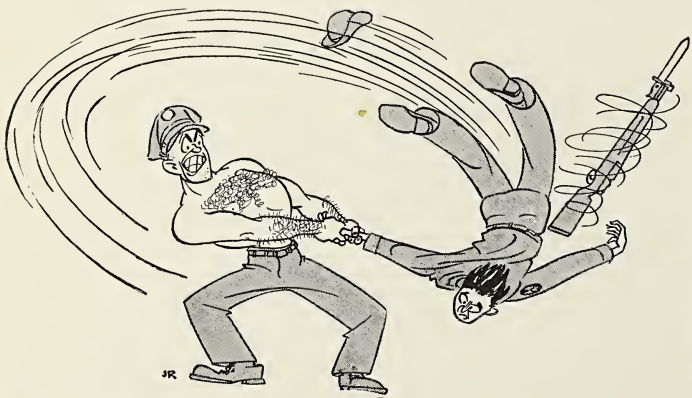
It was, we wished to believe, a compliment. It did mean that we had been accepted.

The Infantry went into the field with its machine guns, howitzers, rifles and packs. The Engineers reached for their instruments and manuals, and anticipated without anticipation the building of roads, emplacements, the hurdling of the wide, nearby river by pontoon bridge. The Air Corps went into Administration.

A Miami graduate would be familiar with the routine. There were only a few cardinal differences. The majority of the instructors were staff officers from Air Force headquarters, each dealing with his specialty. They talked directly from experience, without textbooks, and were often backed to the wall by the practical questions of students who had been waiting for months to ask about supply, delays, equipment and a hundred other matters that had boiled over during the months overseas.

They gave us brief lectures on engineering, the theory of flight, instruments, weather, communications—on all technical subjects—to acquaint us, they explained thoughtfully, eyeing the average service of 31 months, with the terminology of the Air Corps.

A navigator (Continued on Page 53)



LIFE RAFT EXPERIMENT

The following article is based on the combined observations and conclusions of three officers who played important roles in a life raft experiment conducted on the Gulf of Mexico several weeks ago. They are Maj. George W. Holt, director of air medicine at the AAF School of Applied Tactics; Maj. M. W. Boynton, surgeon of the Flight Control Command, and Capt. George H. Waltz, chief of the air-sea rescue section of the FCC.—THE EDITOR

A FEW weeks ago, two rubber life rafts could be seen drifting in the Gulf of Mexico twenty miles off a Florida base. To all appearances, they held the survivors of a crash landing at sea. Actually, the occupants were officers and enlisted men who had volunteered to test the rafts and the equipment and rations furnished for emergencies on our bombardment aircraft.

The experiment, which lasted six days and six nights, was under joint supervision of the Flight Control Command and the medical branch of the AAF School of Applied Tactics. It was made to determine the following:

1. The desirability of drinking lots of water prior to long over-water flights.
2. The advantages or disadvantages of keeping the clothing saturated with sea water in an attempt to prevent perspiration and thereby conserve body fluids.
3. The relationship of such factors as exercise and solar exposure to the rate of dehydration.
4. The advisability of drinking large amounts of water when it becomes available after prolonged dehydration, as compared with drinking small amounts at frequent intervals and hoarding the remainder.
5. The effectiveness of various sunburn lotions and creams.
6. The desirability of including certain items of diet now provided as emergency rations.
7. The practicability of all equipment in life raft kits.

The test also was intended to provide a source of information, based on controlled practical experience, for teaching purposes.

At 1630 on a Sunday nine officers and enlisted men, wearing summer flying suits, fatigue hats, socks and shoes, went overboard from the Army Crash Boat P-269 into the two life rafts. For the next 135 hours, or until approximately 0600 the following Saturday, all but one of these men remained constantly on the rafts, except for short periods on board the attending crash boat where daily medical studies were made. Thus, most of each day and all of each night were spent on the rafts, affording a good opportunity to study both the equipment and the physical and mental reactions of the men aboard the rafts.

During the first night, five men occupied the A-3 (1,000-pound capacity) raft and four men the E-2 (2,500-pound capacity) raft. Throughout the night a severe rain and wind storm kept the rafts and their crews constantly alert and continually drenched with sea water. Sleep was impossible. After the first few hours

Some conclusions reached after eight officers and men spent six days and nights on the Gulf testing raft equipment.

of wind, rain and heavy seas, one of the four men on the E-2 raft became so violently seasick that he had to be taken off the raft and subsequently moved to a hospital on shore where he remained for 36 hours. This man lost eight and a half pounds during the night and went into shock so severe that neither his pulse nor his blood pressure were obtainable at times. He also became disoriented and confused. From his experience it became quite evident that seasickness can become severe enough to a man adrift on a life raft to result in death.

THE next morning, inspection of the kits fastened to the floors of the life rafts showed that because of the lack of watertight closures on the kit containers almost half of the equipment was ruined and had to be discarded. Signal flares were soggy and unusable, the first-aid kit was completely soaked in sea water, the Very pistol was badly rusted as was a .45-caliber automatic pistol placed in the A-3 raft kit for safekeeping, and the rubber patching kit was so badly water-soaked that it could not have been used to repair even a small puncture or rip in the raft. MORAL: Inspect the life-raft kit in your airplane and place flares, first-aid kit and any other pieces you feel may be ruined by salt water, in waterproof bags. If you can get them, waterproof icebox bags are satisfactory. Grease your knife, Very pistol and automatic before every long overwater flight.

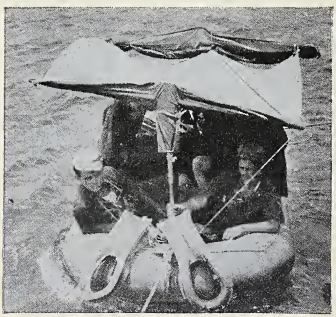
Because of the extreme crowding on the A-3 raft, two of the five men moved to the larger raft the following morning, and for the rest of the test three men occupied the A-3 and five men the E-2.

To make the test as complete as possible, various duties were assigned each man. Throughout the following day, the men on the smaller raft attempted to protect themselves from the sun by stretching a tarpaulin over the raft, while the men on the E-2 raft had no such protection. The men on the larger raft felt the effects of dehydration considerably more than the men on the A-3 raft. MORAL: Use your oars, sail and/or tarpaulin, yellow side up, to rig a canopy over your raft. Besides protecting you, it will make your raft easier to see.

During the first 24 hours, none of the men had either food or water. After that, seven of the eight men were given a reduced ration of one standard K ration box and 330 cc (approximately two-thirds of a pint) of water a day, while the eighth man continued to do without food or water for four days and four nights. A 38-year-old medical officer, he experienced no great hunger or thirst after the initial period of accommodation to conditions, indicating that with proper self-imposed discipline even a considerably longer period of fasting is possible for anyone in good physical condition. As a matter of fact, this officer, without food and water, felt thirst far less than the average of the other men who had their daily ration of food. MORAL: When you have no water, don't eat dehydrated or dried heavy foods.

Before going on the raft, this officer had fortified himself by drinking large quantities of fluids—the total equal to more than three times his usual daily consumption. To this and to the fact that, although an inveterate smoker, he stopped smoking when he got aboard the raft, he attributed his lack of any great feeling of thirst for the 96-hour period. MORALS: Drink all the liquids you can comfortably hold before and during all long overwater flights. Don't smoke if you have no water.

On the third day, two of the men were so completely dehydrated that an additional water ration became necessary. The men were weak and mentally confused. Each was given two quarts of water,



Taking part in the experiment.

which he drank within an hour. Contrary to general belief, they experienced no feeling of nausea but quite the reverse—a feeling of renewed strength and a brighter mental attitude. A careful medical check of these men during the next 36 hours showed that they retained most of the water taken. MORAL: If you collect rain water, immediately drink as much of it as you can comfortably hold. Your body can store water and it makes a far better container than a bailing bucket or a tin can. Store the rest, preferably in the regulation water cans which you have already emptied. Some of the water taken in large quantities when you are dehydrated is lost through perspiration or excessive urination. However, a quart of water in your body is worth several quarts stored where they may be lost if the raft tips over or spoiled by sea spray.

For the duration of the test, one man kept his clothes continually wet with sea water and at the same time kept himself out of the sun as much as possible. Without any greater feeling of thirst than the rest of the men, he was able to exist with considerably less than the regular daily ration of water. MORAL: In shark-free waters and warm climates during sun up hours dunk yourself, clothes and all, periodically. Lower yourself over the side slowly to keep your face and mouth out of the sea water. Don't exert yourself by swimming, just hang onto the hand line. If one's general condition precludes dunking, the clothes may be splashed with sea water.

During the third and fourth days, two men with little previous fishing experience were detailed to test the life-raft fishing kit. They were handed the kit and given no further instructions. Selecting the largest hooks and lines, they fished for several hours. Result: No fish. It was then suggested that they try the smaller hooks and pork-rind bait provided in the kit. Within twenty minutes a small fish was hauled aboard. It was cut up for bait and used on the larger hooks. Within an hour, two ten- or twelve-pound fish had been caught. MORAL: Don't go after the big fish first. Catch small ones with your small hooks baited with pork-rind and cut up the small fry for baiting the larger hooks. Don't try to hook excessively large fish, for they will only break your line and run off with your hooks and bait.

MEDICAL tests made before, during and after the experiment showed total weight losses ranging from one to ten pounds with the average loss somewhat over a pound a day for each volunteer during the six-day period. The thinnest men at the start lost the most at the end, the fattest the least.

Except for a general weariness and mental fatigue, there were few changes physically in the men. A comparison of the results of the physical examinations for flying (W.D. A.G.O. Form No. 64) given before the start of the test and those given at the conclusion showed only minor variations.

The circulatory systems as measured by electrocardiogram, pulse, blood pressure and Schneider index showed no evidence of deterioration. The eyesight of all volunteers remained normal in spite of the daily exposure to wind and sun.

The greatest single factor contributing to the general weakness which first evidenced itself on the second day was the inability to get comfortable enough in the rafts for restful sleep. The best position was found to be crosswise with the men alternating feet first and head first, but even in that position it was difficult to sleep for more than a half to three-quarters of an hour at a time.

Out of the test also came a number of suggestions for additions and changes in the life-raft rations and medical kit and life-raft equipment kit. These recommendations are being passed on to the proper agencies for consideration. ☆

AAF TRAINING COMMAND

Our training operations following consolidation of the Flying Training and Technical Training Commands.

It is difficult to comprehend the time, effort and money necessary to train the ground and air crewmen for just one American bomber.

But we do know that for one bomber the training assignment is immense. The pilot gets a $25,000 course in which he learns to guide his four-engine Fortress or Liberator, and to fly on three motors and on two through night and storm. The navigator is an expert at tracing reliable paths through strange skies. Weeks of mind and body-wracking study give the bombardier a right to boast, "I can put 'em in a pickle barrel." Gunners fire thousands of rounds of skeet, .22 cartridges, 12-gauge shotgun shells, .50- and .30-caliber bullets before they are judged ready to put the sting in our bombers.

The mechanics first become intimate with propellers, instruments, engines, hydraulics, electrical and fuel systems, and the other working parts of aircraft before they are ready as maintenance specialists. There has to be a system to teach the armorer about electricity, how to assemble machine guns blindfolded, how to load ammunition and bombs and adjust power turrets. The radio man learns to send and receive, repair, maintain and install aircraft radio, and to master operational and airdrome tower procedure.

There are the parachute riggers, weather forecasters and observers, and many more.

Multiply the problems involved in manning that one plane by the total of all the bombers, fighters, trainers, gliders and miscellaneous types (Continued on Page 30)

General Yount (seated) and the commanding generals of the flying and technical training commands (left to right), Generals Hanley, Fickel, Brant, Curry, Cousins and Martin.

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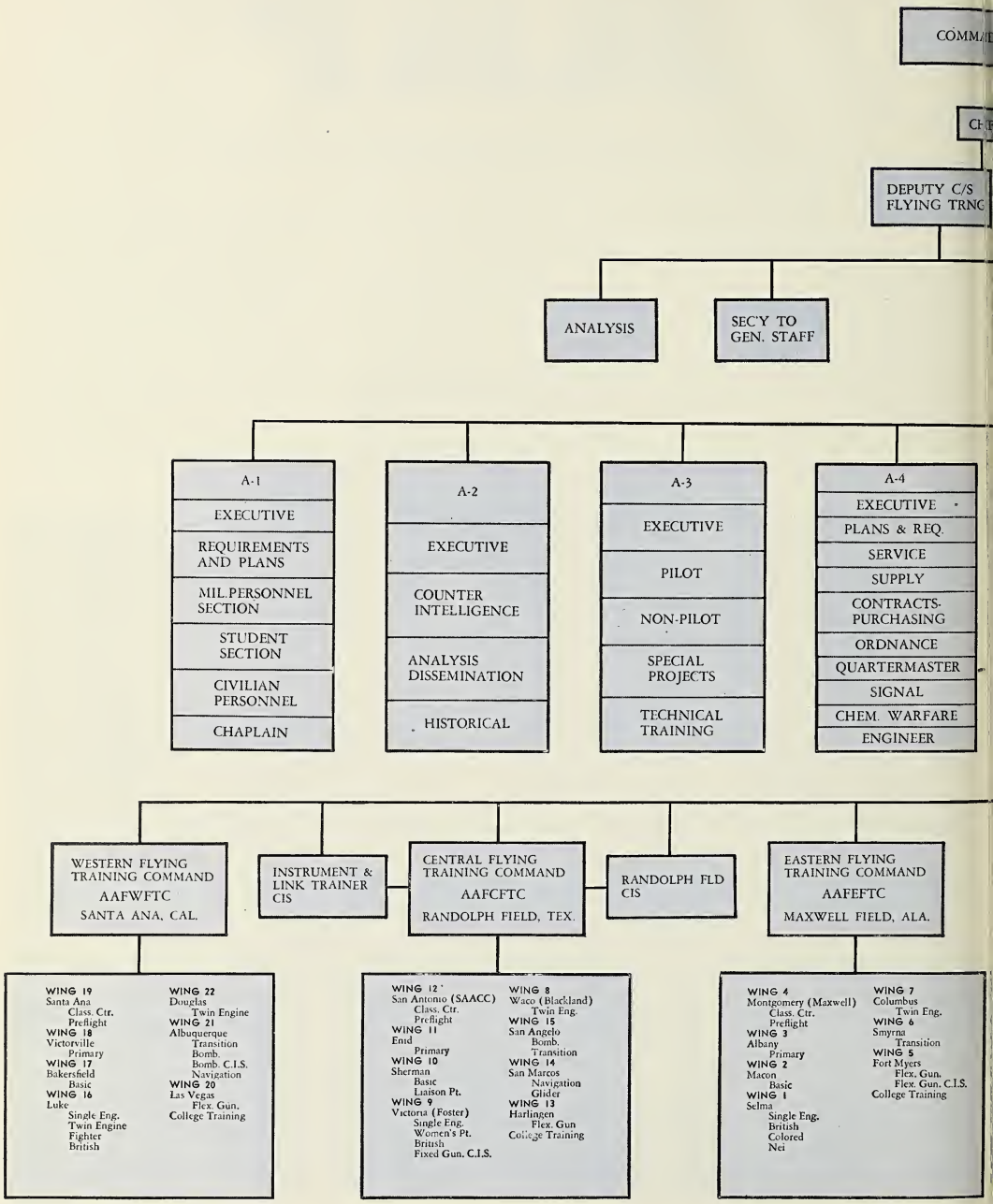

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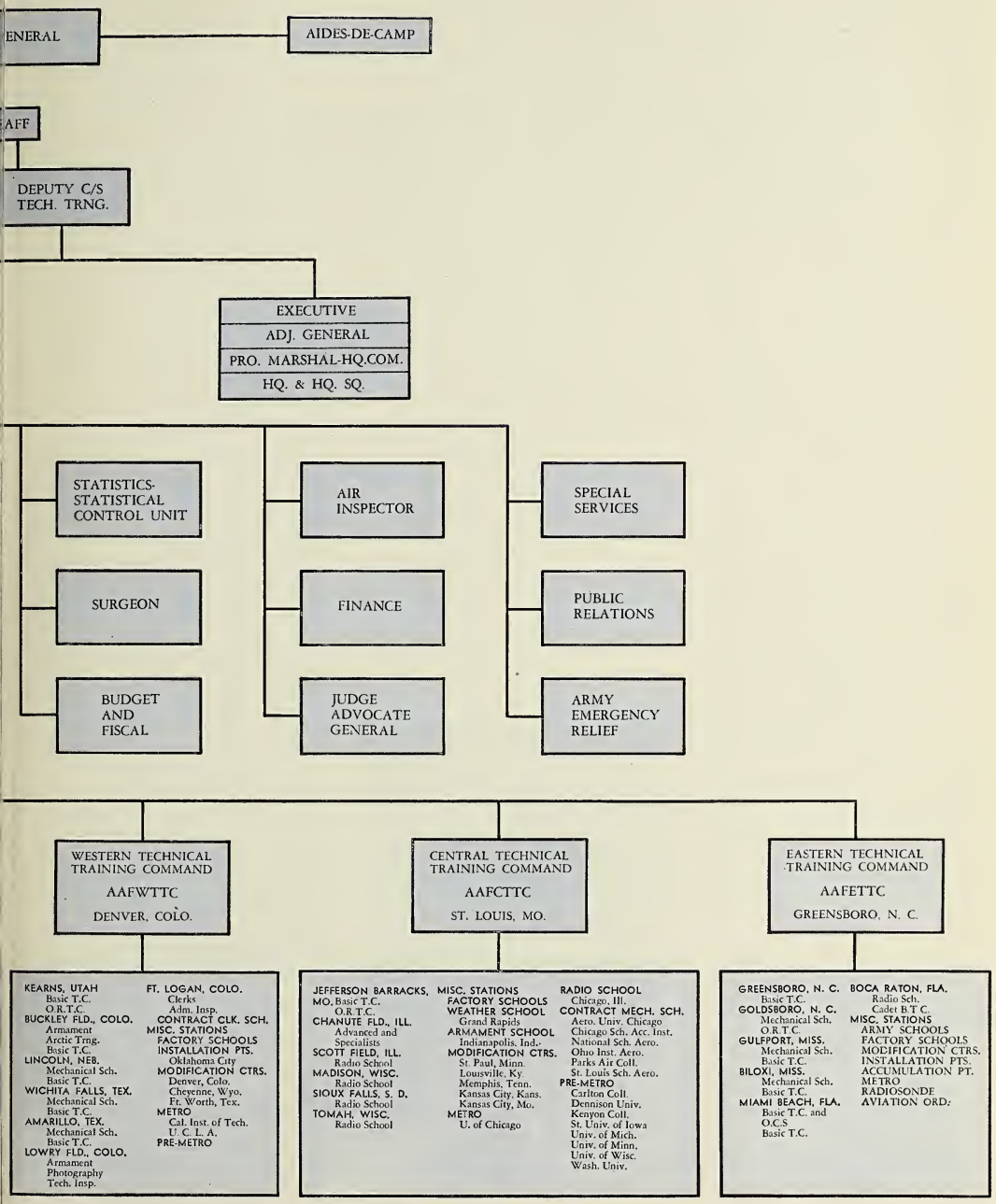

ORGANIZATION ARMY AIR FORCES TRAINING COMMA

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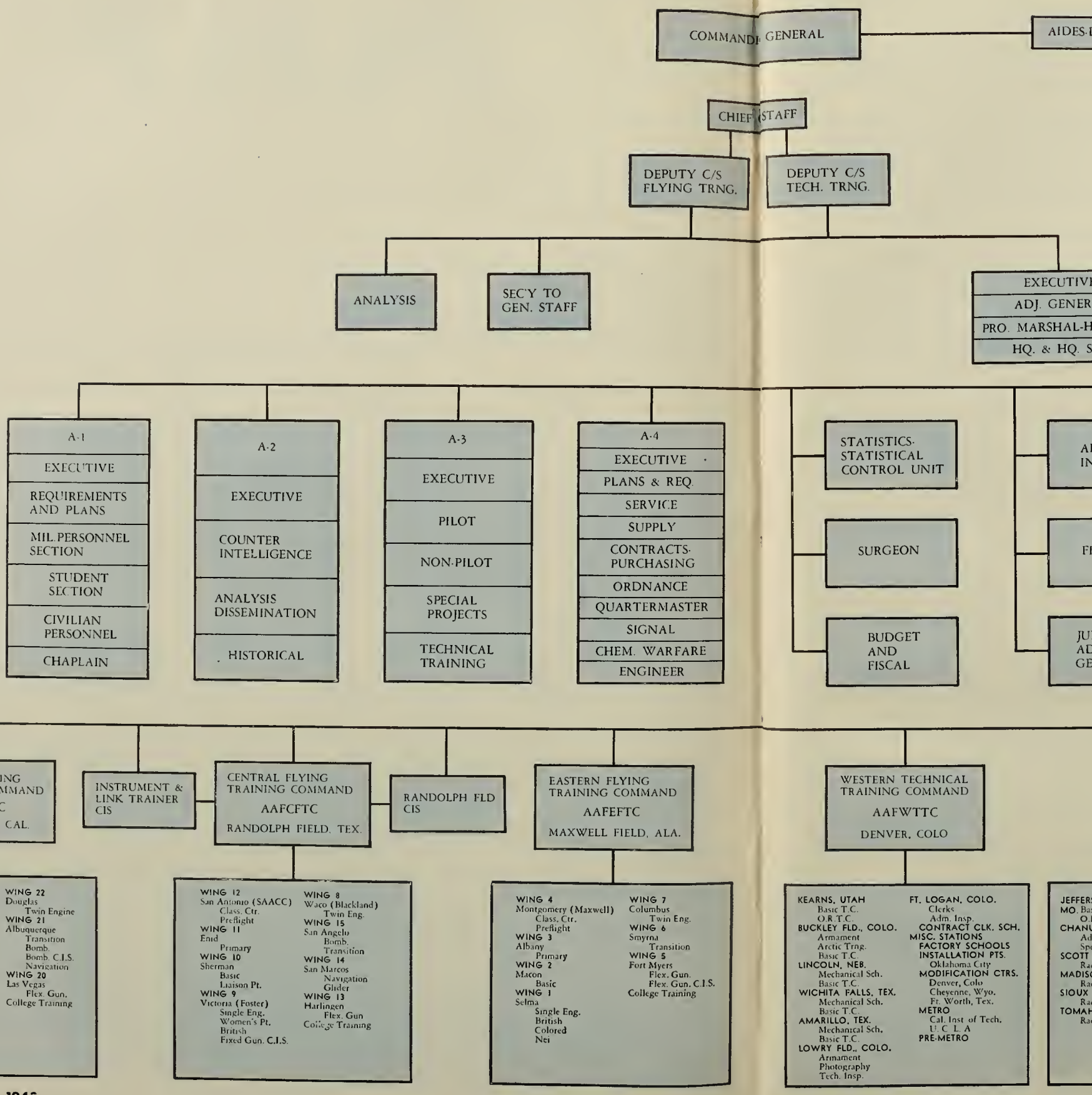


of aircraft that constitute the greatest air arm in history, and you may get an idea of the responsibilities which rest upon the Army Air Forces' newest agency—the Training Command.

The AAF Training Command is new, but the two parts of which it is composed already were well-known and respected, each in its own right, for the importance of their individual operations.

The Flying Training Command had accomplished the task of supplying the personnel for an air force sufficiently powerful to turn back an enemy that had a big edge in the beginning. Its alumni are the pilots, bombardiers, gunners and navigators who have written their names in destroyed Axis planes and properties in Europe, the Aleutians, North Africa and New Guinea.

The Technical Training Command made possible the attainment of the ultimate goal of the flying training organization. For, without TTC's mechanics, technicians and other ground-experts, there would have been no planes to fly, no guns to shoot, no bombs to drop.

Flying and technical training always have been blood-brothers. There were common problems which often brought officials of the two programs together. And, of course, there were countless common interests and, most important of all, the mutual desire for victory.

It was but a natural blending when, on July 7, 1943, the War Department announced that the Flying Training Command and the Technical Training Command would be consolidated to form the Army Air Forces Training Command. Maj. Gen. Barton K. Yount, who had been chief of the flying training program, was named commanding general of the new twofold Command.

Integration and streamlining of the air and ground training mission of the AAF was accomplished to achieve an even greater coordination in effort. The reorganization calls for maximum efficiency in operation, with a minimum of staff personnel and disruption of current activity.

In addition to Brig. Gen. Walter F. Kraus, presently appointed chief of staff, General Yount's headquarters in Fort Worth, Texas, now includes Brig. Gen. William W. Welsh as deputy chief of staff for flying training, and Col. John P. McConnell as deputy chief of staff for technical training.

The consolidated Command represents the largest such unit within the Army with headquarters outside Washington.

The new Command is nationwide in scope. It has been divided geographically into western, central and eastern areas, within which flying and technical training functions will be closely coordinated.

Flying Training Centers, (West Coast, Gulf Coast and Southeast) which existed under the old Flying Training Command, have been redesignated respectively as

AAF TRAINING COMMAND

(Continued from Page 27)

the Western Flying Training Command, Central Flying Training Command and Eastern Flying Training Command. Headquarters remain the same, with Maj. Gen. Ralph Cousins commanding the WFTC at Santa Ana, Calif.; Maj. Gen. Gerald C. Brant, the CFTC at Randolph Field, Texas, and Maj. Gen. Thomas J. Hanley, the EFTC at Maxwell Field, Ala.

Flying Training Wings, each commanded by a general officer, will continue to operate within each of the three Flying Training Commands. Established on a purely functional basis, training wings will serve to coordinate training activities at the various specialized schools in accordance with directives from higher headquarters. In the WFTC, two wing headquarters are located at Santa Ana, Calif. Others are at Bakersfield, Calif., Luke Field, Ariz., Douglas, Ariz., Albuquerque, N. Mex., and Las Vegas, Nev.

Wing headquarters in the CFTC are at Enid, Okla., and at San Antonio, Sherman, Victoria, Waco, San Angelo, San Marcos and Harlingen, all in Texas.

EFTC wings are located at Montgomery, Ala., Valdosta, Ga., Macon, Ga., Selma, Ala., Columbus, Miss., Smyrna, Tenn., and Fort Myers, Fla.

The five former technical training districts have been consolidated into three Technical Training Commands. The reorganization provides for the inactivation of the old Technical Training Command headquarters at Knollwood Field, N. C., and of the Third and Fifth Technical Training Districts, with headquarters at Tulsa, Okla., and Miami, Fla. Facilities at Tulsa and at Miami were reassigned to the three new Technical Training Commands, effective August 31, 1943.

Commanding the new Western Technical Training Command, with headquarters at Denver, Colo., is Maj. Gen. John F. Curry; Central Technical Training Command, St. Louis, Mo., Maj. Gen. Frederick L. Martin, and Eastern Technical Training Command, Greensboro, N. C., Maj. Gen. J. E. Fickel.

"Didn't you say we are going to sweep the channel?" —FRITZ WILKINSON

Individually, the Flying Training Command and the Technical Training Command were conducting coast-to-coast activities which staggered the imagination. The over-all program, vested today with the job of producing the complete manpower needed to win an air war, is almost beyond comprehension. The duties of the new Training Command constitute a serious challenge, and one which must and will be met successfully.

From the Atlantic to the Pacific, from the Gulf of Mexico to the Canadian border, there are college training programs in progress for future aviation cadets; pre-flight and classification schools; elementary, basic and twin-engine and single-engine advanced schools for pilots; two- and four-engine pilot transition schools; bombardier, navigation and gunnery schools; Central Instructor Schools for "teachers" of flying, bombardiering and gunnery; liaison pilot schools and others for West Point cadets, women ferry pilots, glider pilots and foreign nationals.

The Training Command, on the technical side, will conduct the AAF Intelligence School at Harrisburg, Pa.; Administrative Inspectors' School at Fort Logan, Colo.; Photographic Officer Pilot School at Lowry Field, Colo.; Administrative Officer Candidates School at Miami Beach, Fla. and the Statistical Officers' School at Cambridge, Mass. In addition, there are scores of schools for airplane mechanics, aircraft machinists, sheetmetal workers and welders, armorers, parachute riggers, radiomen, glider mechanics, aerial photographers, weather observers, weather forecasters, teletype maintenance men, and for aviation cadets who will be trained for the duties and responsibilities of technical officers.

Two paralleling organizations have been dove-tailed naturally into one smooth production line. Bringing them under the jurisdiction and direction of the same authority will coordinate training with requirements, changes with developments and manpower with machines.

Key personnel of the TTC are moving into enlarged office space in the former FTC headquarters building in Fort Worth, a city chosen because of its central locality and ready accessibility to every flying training field in the nation by military or commercial aircraft.

The Training Command's prescribed task is to see that the two endeavors of flying and technical training are performed as one in the most efficient manner possible. Officials in Fort Worth, officers and men at the many stations, and cadets and students in every corner of the United States intend that this task shall be accomplished. ☆

THE NEW MUSTANG P-51

The P-51 is the AAF's only "war baby" now in combat.

With no family tree of design precedent, the P-51 was conceived seven months after the Nazis invaded Poland, carried from the idea stage to a warplane when the Germans were marching through Western Europe and taken on its maiden combat flight after the fall of France. The British called it the Mustang, "tough, maneuverable, no vices."

Today, American and British fighter pilots are receiving a new P-51, a high-altitude version of the Mustang, powered with the Packard-built Rolls-Royce Merlin engine. In this version, critical altitude and horsepower of the plane have been increased greatly by the Merlin engine with its two-stage supercharger. Wing design changes have raised the fuel capacity, giving it greater range than any other single-engine fighter.

Test pilots are enthusiastic in their praise of the new P-51 models. They like its speed, high-altitude performance and ease of handling. A combat veteran, after testing the ship, likened the controls and handling instruction to those of the AT-6 and said he felt as if he had "just attended old home week and met an old friend."

Rapid response to the controls and ease of handling are also characteristic of the early P-51, but modified control surfaces make them even more pronounced in the later version. Other factors which contribute to these features and add to the pilot's convenience are automatic oil and prestone shutters, automatic supercharger control, simplified gas system and a device which automatically locks the tail wheel in fore and aft position whenever the elevator control stick is in a position aft of neutral.

Years of testing, research and experimentation usually precede the production of a combat plane. The P-40 was developed from the P-36, the P-47 was an improvement of the P-43, and the P-38, an original design, was conceived long before the war and was on the production line before December 7, 1941. Not so with the P-51. It was dreamed up seven months after the war began, designed and built in 100 days and put into production the same year.

Although the AAF received two of the first Mustangs built and conducted extensive experimentation with the planes, the credit for the original design and construction goes to North American Aviation, Inc.

In April, 1940, the British asked North American to build on subcontract a fighter already in production by another company. North American countered with a proposal that an entirely new plane be created to incorporate the latest findings in aerodynamics and combat experience. The British agreed, providing a 120-day deadline could be met, an inline engine used and provisions made for specified armament.

The project was turned over to the company's engineering department. Edgar Schmued, chief design engineer, and his staff began work on a Saturday afternoon and worked all night to complete an inboard profile for inspection by the company president Sunday morning. This and a preliminary weight estimate were approved, and the company accepted the British deadline.

More than 2,800 original design drawings were needed, and the work of producing them was divided among specialists in power plant, landing gear, tail section, armament and the like.

From skeleton specifications, sketches, personal check-ups and constant revisions, the "specs" were finally turned out and sent to the experimental shop where a full-size wooden mock-up was being made by a crew working day and night, to the wind tunnel group which was carving a $20,000 quarter-size model from laminated mahogany to tolerance as fine as .001 of an inch, to loftsmen who were laying out the full-scale drawings from which the templates used in production were to be made, and to the purchasing department which rushed the parts on verbal instructions from Schmued.

Best known of the advanced ideas brought into the design was the so-called "laminar flow" wing, based on principles developed by NACA in extensive wind tunnel research. Schmued and Edward Horkey, young aerodynamic expert, believed in it thoroughly but a trick of circumstances almost negated their work. First wind tunnel tests indicated some bad stall characteristics, so they took the wing to a larger tunnel where it worked perfectly and became a major factor in the plane's speed.

The inline Allison was used to reduce the frontal area as much as possible. However, use of the liquid-cooled engine presented a problem in a large, drag-producing radiator scoop, usually placed in the nose. It was relocated underneath the fuselage. When, however, the engine heated up in flight tests, additional wind tunnel tests revealed that the turbulent boundary layer of air under the fuselage was entering the scoop and destroying the efficiency of the cooling system. By lowering the lip away from the bottom of the fuselage, engineers were able to sidetrack the turbulent air and attain circulation of "clean air."

Not all new ideas were successful. A semi-spherical, molded plastic windshield so distorted pilot vision that the regular flat windshield had to be substituted.

With a ton of engine and propeller in the nose exerting terrific forces in hard pullouts, bad landings and acrobatics, strength was essential. Pressure and weight tests of all kinds had to be made on the wings, including the piling of 80,000 pounds of weights on them.

A rumble caused by pulsations in the cooling air scoop was eliminated when the air scoop was lengthened and moved slightly outside the boundary layer of air close to the fuselage.

A streamlined radio mast that had worked perfectly on other planes vibrated badly and snapped off at the high speeds of the P-51. This was solved when an engineer took a steel tube, smashed it almost flat and installed it with the narrow axis in the direction of flight.

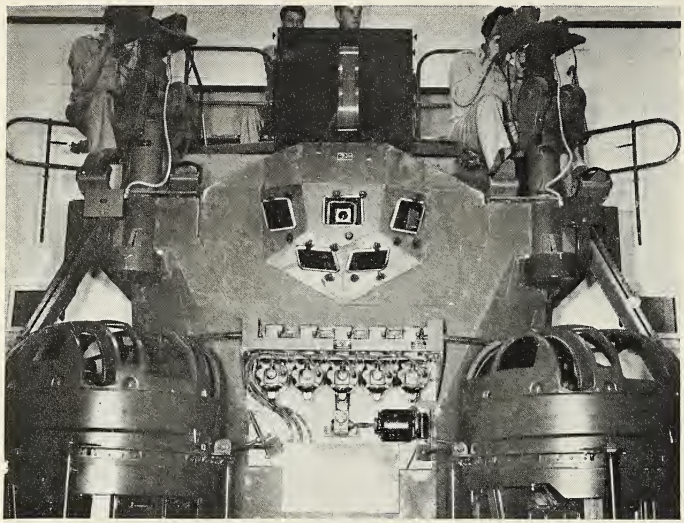
The finished product weighed approximately 8,000 pounds, with a wingspread of 37 feet and an over-all length of 32 feet.

The P-51 passed its factory flight tests successfully and on Armistice Day, 1941, made its first flight in England—but only after British anti-aircraft batteries had been warned of the appearance of a new fighter which closely resembled the Messerschmitt in silhouette.

Later, the Nazis were confused in identifying the new plane on its first flight over one of their airdromes, and they paid a heavy price.

And they are still paying. ☆

(Technique Continued)

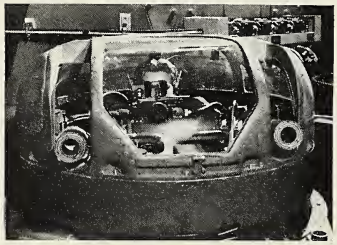


Front view shows instructor's position in upper center, two hand-held gun positions and two turret positions. In the center are the projection ports of the five projectors.

Waller Gunnery Trainer

Utilizing all the latest Hollywood technical features, the AAF has developed a dome-shaped gunnery trainer that simulates most actual combat conditions to be met in aerial warfare.

Dummy guns, mounted and weighted as .50-caliber machine guns, fire bursts of "light rays" at planes projected on a dome-shaped movie screen forty feet in diameter. Hits, bursts and rounds fired are recorded on electrical counters visible to the instructor. A bell rings in the students' earphones when his point of aim is on the nose.



A student (above) sights through the reflector sight of the Sperry upper turret. The aim-light projector is to be seen at the left of the sight. Note .50-caliber gun sleeves.

The unit is known as the Waller gunnery trainer for its inventor who also constructed the inner workings of the perisphere at the New York World's Fair.

Although intricate in design and construction, the trainer's operation is almost as realistic as actual aerial combat. Five 35 mm film projectors with sound tracks throw a composite picture of attacking combat planes on the screen. The sound tracks lend realism as the gunner hears the chatter of gunfire when he depresses the gun triggers.

Spots of colored light reveal where the guns are being aimed, photo-electric circuits control the angle of the "burst" and compensate for the lag from the time the gunner squeezes the trigger until the shells reach the target. Vibrators simulate actual conditions in firing.

Earphones keep the instructor constantly in contact with his four trainees, enabling him to coach them in their firing. When he wants to point out an error or illustrate a new point, he can freeze all action, stopping film, sound and firing but leaving the images clearly projected on the screen.

Power turrets are installed in two of the four gun positions.

This photo of the Waller gunnery trainer taken toward the spherical screen shows an instructor at the console and two upper gunners. An attacking plane appears on the screen. The circles superimposed on the plane show the correct position of the gunsight at that instant of the attack. In training, these aim circles appear intermittently to instruct the gunner in the correct point of aim. When the attacking plane appears on screen without the aim circles the gunners fire and their score is recorded.

Trailer Made from Standard Prop Dolly

This trailer, used by all squadrons at Roswell (N. Mex.) Army Air Field for hauling supplies to the line, was modified from a standard propeller dolly by moving the wheels forward to place them in the center of the trailer and replacing prongs and box with a wooden bed. Racks for two-bladed propellers may be installed over the wheels. — **Maj. John S. Loomis, CO, 91st Sub-Depot.**

The improvised bombardier trainer (above) made from salvaged materials by a B-26 squadron in North Africa. The "inventors" of the contraption are (left to right) Lieutenant G. K. Rhodes, Captain Joseph F. Perrin and Tech. Sgt. Herbert W. Eckhardt.

Training During Combat

A Rube-Goldberg contraption, composed of discarded gas pipe, a wheezy putt-putt, two twelve-volt batteries, a plumb line, an intervalometer from a B-26, a steering wheel from a five-ton truck, wheels, axles and assorted parts from wrecked jeeps, trailers and salvage dumps all over North Africa, has made an efficient bombardier trainer for a B-26 squadron in North Africa.

Like other bombing squadrons assigned to overseas duty, this unit discovered that while its pilots and navigators had been given plenty of practice ferrying their planes across, the bombardiers had become rusty on the operation of their bombsights.

Capt. Joseph F. Perrin, squadron bombardier, decided to tackle the problem. A makeshift practice device rigged on the back of an ordnance truck sufficed for awhile, but practice was continually interrupted when the truck was utilized for its prescribed purposes.

So to rig up the animated gas pipe giraffe shown in the accompanying photograph, Captain Perrin enlisted the aid of Lieut. G. K. Rhodes and Tech. Sgt. Herbert W. Eckhardt and they scoured the countryside for parts.

The seats came off a wrecked weapons carrier and the intervalometer from a B-26 that just managed to limp home from a mission over Tunisia. Two wheels and a platform were salvaged from a smashed trailer. A wrecked jeep supplied the other two wheels and an axle. The steering wheel with which the pilot "flies on course" came from a five-ton truck.

Most of the actual construction work was handled by Sergeant Eckhardt. In addition, he haunted the communications department until he was given the batteries needed for instrument impulse.

As a result of practice on this trainer the combat efficiency of the squadron was raised considerably, and the group CO ordered all bombardiers to take a certain number of hours a month on the trainer. Pilots, too, were ordered to practice on the contraption. **— Lieut. William Cook, Northwest African Strategic Air Force.**

Transparent Celestial Sphere

From two defective astro-domes, Lieut. Col. J. E. Davis, Wright Field, made this simple celestial sphere to facilitate study of navigational stars.

By looking through the transparent sphere, stars appear in the same relative positions as they do when looking skyward from the ground. Normal celestial spheres show the stars in reverse—as they would appear if you were in a position outside the universe.

After cementing the two navigational

domes together, Colonel Davis cut in the latitude and longitude lines and drilled holes in the exact position of the stars in rough magnitudes. A fluorescent material was then sealed into the holes. In a dark room the stars glow and appear to twinkle. Allegorical figures were etched on the constellations for purposes of instruction.

Tie-down System

A tie-down device using a chain and boomer has been in effective use at Pecos (Texas) Army Air Field, basic flying school, for several months. It consists of two rings set in concrete through which a chain with a hook at both ends is passed. After attaching the hooks to the towing rings of the aircraft, the slack is taken up by throwing the boomer which locks automatically. A ring is also set in concrete to correspond with the tie-down ring of the plane's tail section. A one-half inch rope through both rings serves this purpose.

During severe windstorms the device proved its merit as a safety system. Pressure in the tires tends to relieve strain and makes these tie-downs flexible from three-fourths to one and one-fourth inches.

The device was introduced by Col. Harry C. Wisehart, commandant of the field, and designed by post engineers under the supervision of Maj. Harry L. Stebbins. **— PRO, WFTC.**

Always in Place

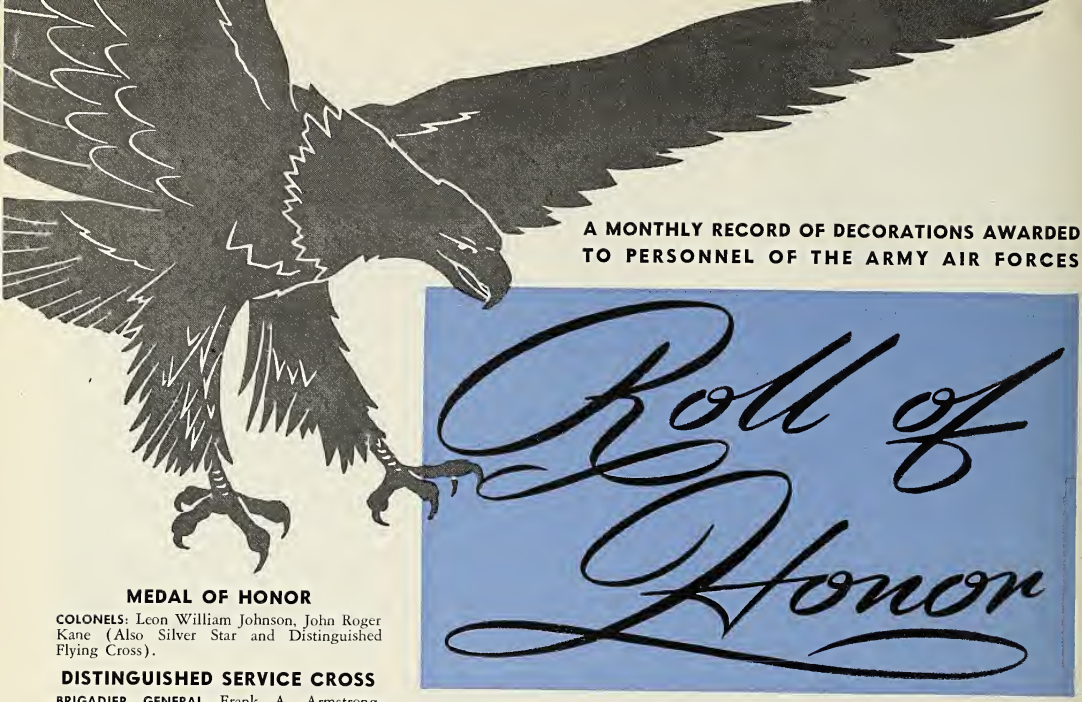
A refinement has been worked out on the standard portable engine hoist at the 59th Sub-Depot, Lowry Field, Colo., to give ready access to the crossbar, which connects the lower ends of the front legs, and to have it always available.

The crossbar is connected permanently to the vertical leg by a chain on a piece of cable. **— Lieut. Col. R. S. Smilie, CO, 59th Sub-Depot.**

New Bearing Packer

A wheel bearing packer, an easily operated device constructed entirely of spare parts, is the invention of Tech. Sgt. Jack Baity (below) 326th Basic Flying Training Squadron, Minter Field, Calif. The principal feature of the device consists of a cup fitted on a grease gun which is set on a base. The bearing is placed in the cup and a handle pressed down forcing the new grease upward and removing the old lubricant and cleaning solvent.

The packer which will grease all sizes of bearings, represents a saving of one-third on lubricating compounds, as well as a considerable amount of time. **— PRO, WFTC.** ☆



A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

Roll of Honor

MEDAL OF HONOR

COLONELS: Leon William Johnson, John Roger Kane (Also Silver Star and Distinguished Flying Cross).

DISTINGUISHED SERVICE CROSS

BRIGADIER GENERAL Frank A. Armstrong. **MAJOR** Thomas J. Classen. **CAPTAINS:** Gerald J. Crosson (Also Distinguished Flying Cross), Cecil C. Duncan (Also Distinguished Flying Cross and nine Oak Leaf Clusters to Air Medal), Frederick F. Wesche, 3d (Also Silver Star, Distinguished Flying Cross and Air Medal). **LIEUTENANTS:** Robert J. Dorwart, Murray J. Shubin. **STAFF SERGEANT** John R. Roller.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERAL James H. Doolittle. **BRIGADIER GENERAL** Orvil A. Anderson. **COLONELS:** Charles B. B. Bubb, Benjamin S. Kelsey, Paul H. Prentiss, Walter S. Smith*.

OAK LEAF CLUSTER TO DISTINGUISHED SERVICE MEDAL

LIEUTENANT GENERAL Frank M. Andrews*. **BRIGADIER GENERAL** Uzal G. Ent.

LEGION OF MERIT

MAJOR GENERAL Ira C. Eaker. **BRIGADIER GENERALS:** Francis M. Brady, Howard A. Craig, Asa N. Duncan, Haywood S. Hansell, Jr., Laurence S. Kuter, Paul L. Williams. **MAJOR** Jerome W. Jackson. **MASTER SERGEANTS:** John S. Eubanks, Howard F. Nutting, Edmund G. Robinson, Carl H. Russell, Steve Taylor. **TECHNICAL SERGEANTS:** Everett K. Bloomfield, Kenymore K. Cover, Alexander Erosky, Henry P. Mac Neill, Woodrow E. O'Brien. **STAFF SERGEANTS:** James P. McGloin, Arthur L. Olson, Arthur C. Robinson. **SERGEANTS:** Kenneth E. Atwell, Joseph Cibella, Fred S. Crane, Louis Criscuolo, William H. Davey, Harold J. Day.

SILVER STAR

BRIGADIER GENERAL Joseph H. Atkinson (Also Air Medal with Oak Leaf Cluster). **COLONELS:** John C. Crosthwaite, Carlyle H. Ridenour, James H. Walsh. **LIEUTENANT COLONEL** Dale D. Brannon (Also Distinguished Flying Cross). **MAJOR** Delwin B. Avery (Also Purple Heart, Distinguished Flying Cross and ten Oak Leaf Clusters to Air Medal). **CAPTAINS:** Blair M. Sorensen, George S. Welch (Also Distinguished Flying Cross and Air Medal). **LIEUTENANTS:** Stanley O. Andrews, Peter M. Childress, Eugene B. Davis, Allan P. Forsyth (Also Air Medal), Byron H. Gilmore, Lynwood M. Glazier, John F. Keith, Robert S. Miller, Donald Scullion, Harry R. Sengle. **MASTER SERGEANTS:** Francis A. Klaiber, Harry Urban. **TECHNICAL SERGEANT** Donald O. Martin. **STAFF SERGEANTS:** John C. Caputo, Dominick J. Genard, Robert T. Jungbluth, William H. Schiffer. **SERGEANTS:** Howard Cantor (Also Distinguished Flying Cross and Air Medal), William T. Gleason (Also Distinguished Flying Cross), Isaac Kaplan. **AVIATION CADET** Charles F. Buchholz.

* Posthumous

OAK LEAF CLUSTER TO SILVER STAR

LIEUTENANT William G. Bennett* (Also Air Medal*). **SERGEANT** William H. Nichols.

PURPLE HEART

LIEUTENANT COLONEL Curtis Low. **MAJOR** Albert Zipser (Also Distinguished Flying Cross and Air Medal with eight Oak Leaf Clusters). **CAPTAIN** William H. Wemmer. **LIEUTENANTS:** John Jarvis Cape, Jr., William M. Carrithers, Jesse H. Elliott (Also Distinguished Flying Cross and Air Medal with three Oak Leaf Clusters), Jerome L. Foreman (Also Distinguished Flying Cross*), Lawrence Greensides, John W. Norvell, Harold R. Taylor. **MASTER SERGEANT** Kenneth Lawton. **TECHNICAL SERGEANTS:** Ray Armstrong (Also Air Medal with three Oak Leaf Clusters), David B. Hatch (Also Air Medal). **STAFF SERGEANTS:** Edward Denning, Lawrence E. Dennis. **CORPORAL** Robert G. Thomas. **PRIVATES FIRST CLASS:** James J. Gleason*, James I. Lewis*, Thomas F. Philipsky*. **PRIVATE:** Brooks J. Brubaker*.

DISTINGUISHED FLYING CROSS

BRIGADIER GENERAL James Pratt Hodges. **COLONELS:** Edward H. Alexander, Bernt Balchen, Neil B. Harding. **LIEUTENANT COLONELS:** John Cerny, Robert E. Condon, Felix M. Hardison (Also Air Medal), Boyd T. Hubbard, Jr., Andrew A. Meulenberg. **MAJORS:** Karl T. Barthelmess, Anthony Benvenuto*, Owen F. Clarke, Edgar W. Hampton, Grant Mahony (Also Air Medal with Oak Leaf Cluster). **CAPTAINS:** John Andrews, William J. Casey (Also Air Medal with Oak Leaf Cluster), George H. Davidson, Jr. (Also Air Medal), Paul A. Dorney, Lee C. Holloway, Virgil Ingram, Jr.*, James G. Kandaras (Also Oak Leaf Cluster to Air Medal), Andrew H. Price (With Oak Leaf Cluster), Richard Spotswood Smith (Also Air Medal), Clyde H. Webb, Jr.* (Also Air Medal*). **LIEUTENANTS:** Sylvan Feld, Durward W. Fesmire (Also Air Medal), Charles F. Franklin, James W. Ingram, Edward M. Jacquet (With Oak Leaf Cluster), Vincent Puglisi (Also Air Medal with eleven Oak Leaf Clusters), Perry H. Penn, Isaac W. Smith, Edward T. Solomon, Coleman Stripling (Also Air Medal). **MASTER SERGEANT** Eldon W. Audiss (Also Air Medal with three Oak Leaf Clusters). **TECHNICAL SERGEANTS:** Bud W. Cook, Darrell D. Loy. **STAFF SERGEANTS:** Wayman E. Curry, William E. Gustafon*, Vernon F. Portman, William T. Surgeson (Also Air Medal). **SERGEANTS:** Joe C. Corley, Jr., Kenneth R. De Long (Also Air Medal with Oak Leaf Cluster), John B. Moor (Also Air Medal), Raymond M. Vail. **CORPORALS:** William S. Bates, Marvin D. Middleton, George H. Logan, Santino M. Scolari. **PRIVATES FIRST CLASS:** Lester C. Berryman, Joseph T. McIlvain, Lawrence E. Raley. **PRIVATE** Ralph R. Simons. **AVIATION CADET** James K. Connolly (Also Air Medal).

SOLDIER'S MEDAL

LIEUTENANT COLONEL Jeremiah A. Chase. **MAJOR** Mark E. Conan. **CAPTAINS:** Charles Stone, Harold L. Strong, John C. Wagner. **LIEUTENANTS:** Charles W. Byrd, James Congleton, Jr., Robert D. Lauer. **MASTER SERGEANTS:** Eigel W. Christensen, Dellyous C. Taylor. **TECHNICAL SERGEANTS:** Val Julius Boisdore, James H. Kingsley. **STAFF SERGEANTS:** Robert L. Capel, Albert A. Cattadoris, Carl T. De Angelo, George H. Slemp, Don T. Tetley. **SERGEANTS:** Harold E. Hawkins, William A. Stone. **CORPORALS:** Joseph A. Czajkowski, Morris Mesnik. **PRIVATE** Thomas H. Capel. **AVIATION CADET** Joseph Silva.

AIR MEDAL

MAJOR GENERAL Lewis Brereton. **COLONELS:** Lawrence G. Fritz, Robert M. Love, Lauris Norstad, William R. Sweeley. **LIEUTENANT COLONEL** Samuel Charles Gurney. **MAJORS:** Dalene E. Bailey, Willard A. Fountain. Jacob W. Fredericks (With Oak Leaf Cluster), Otha B. Hardy, Jr., Payne Jennings, Jr., John J. Smith, Jr., Earl Raymond Tash. **CAPTAINS:** Homer E. Adams, Joe P. Baird, Richard P. Belden, Harold A. Bullock, Louis D. Chandler, Roderick G. Darelius, Robert J. Duval, Channing Burton Emberson, Richard F. Ginther, James J. Griffith, John F. Hampshire (With Oak Leaf Cluster*), Melvin A. McKenzie, Horace B. McWhirter, Franklin A. Nichols, Henry A. Orban, John J. Owen, Jr., Delmar J. Rogers, William H. Smith, James F. Starkey, David B. Taggart, Lewis W. Tanner, Everett E. Tribbett (With Oak Leaf Cluster), John I. Turnbull, James Phillip Walker (With Oak Leaf Cluster). **LIEUTENANTS:** John H. Adams, Jr., William B. Adams, Jr. (With Oak Leaf Cluster), Harold C. Brasher, Walter H. Brickett, William K. Britton, Lester W. Brock, Laverne D. Brockman, Addison L. Brown, Marvin H. Bryant, William H. Bryant, Bill Buckingham, George D. Burges, James R. Burgett, III, Donald J. Burkey, Charles D. Burpee, Jr., Claude S. Burtnette, Jr., Titus M. Bush, Donald J. Calhoon, Henry S. Cantrell, Othen Nelson Carlos, Francis B. Carlson, George W. Caulkett, John H. Chalmers, Eldon A. Chappell, William R. Charnley, Hays H. Clemens, Donald V. Coakley, Oscar M. Coe, Jr., Irving T. Colburn (With Oak Leaf Cluster), James E. Compton, Ralph B. Conner, Paul F. Conroy, Robert L. Kleyla, Andrew Kundrat, Anthony L. Leal, James O. Levine, Stanley A. Long (With Oak Leaf Cluster), Harold C. Mc Auliff, Frederick L. Manthe, Harold E. Mitts, John Byrd Murphy, Harold W. Norton, Ashley S. Orr, Harry Owen Patteson, William W. Potter, Jr., John J. Pozerycki, Earl W. Quillman, John B. Roberts, Gerald Talbot Rogers, George A. Rush, William J. Ryan, Verl B. Schoenfeldt, Carl E. Schultz (With Oak Leaf Cluster), Henry H. Schwane, Chris J. Sheppard, Frederick B. Short (With two Oak Leaf Clusters), Richard J. Sierks, Jerome C. Simpson (With three Oak Leaf Clusters), Dorothy P. Shikoski, Edmund G. Smith, Herschel L. Smith, Wilfred L. Smith, Allen W. Snook, William G. Solomon, III, Clarence R. Stampley, Paul Stanch, Russell E. Stevens, Jr., Lucian H. Steyn, Wayne A. Stover, Malcolm Baker Sturgis, John C. Summers, Paul M. Thomas (With three Oak Leaf Clusters), Wilfred N. Turcotte, Harold J. Van Cott, Theodore J. Van Kirk, Ralph L. Vincent, Gordon F. Voght, Otto H. Wellensiek, Wallace D. White, Ralph B. Wildenhaus, Charles R. Wiley, John Sheffield Williamson, Jr., Richard A. Yorke, Louis S. Zamperini. **TECHNICAL SERGEANTS:** William E. Abraham, Francis M. Counselman, Frank M. Ketron (With Oak Leaf Cluster), Joseph Markiewicz*, Guy T. Padgett, Leonard A. Putnam, Harold R. Romer (With Oak Leaf Cluster), Robert H. Williams, Ned M. Woolsey. **STAFF SERGEANTS:** Stephen Gogolya, Merwin A. Griffiths, Clifton W. Groelz, Gervase C. Hollander, Glen E. Justice, Stephen S. Koslowski, Herman T. O. McLelland, James W. Mansfield, Stanley F. Marek, Augustine F. Mazzaccaro, Patsy Micacchione, James Morrissey (With Oak Leaf Cluster), Lawrence W. Nearman, Arthur E. Norgaard, Robert B. Norton, Barney Old Coyote, Jr., Clarence W. O'Neill, Theodore B. O'Shields, Carl E. Owen, David T. Owens, Herman S. Pacheco, Jr., James D. Pruitt, Jr., Norman A. Riggs, Douglas V. Radney, Thurman H. Russell, Harold A. Shaber, Chester F. Shedlebower, Douglas M. Shutes, Carl H. Skinner, Frederick H. Sparks. **SERGEANTS:** John B. Byars, Leslie E. Cain, Thomas W. Crook, Jr., John H. Crowder, Ted R. Groce, George A. Mendel, Robert M. Moffitt, Carl E. Olson, Guy E. Parker, Philip A. Price, Gerard A. Pusch, Robert Spaulding, John P. Wilson. **AVIATION CADET** George A. Wangler.

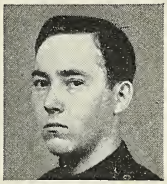
OAK LEAF CLUSTERS TO AIR MEDAL

COLONEL Bruce K. Holloway. **MAJOR** William A. Lanford. **CAPTAIN** Donald L. McKay (2nd). **LIEUTENANTS:** Arthur Eugene Aenchbacker (3rd), William J. Anderson (2nd), John R. Bannon (3rd), Junior M. Barney, Frank R. Beadle (2nd), Clarence L. Harmon. **SERGEANTS:** James M. Abbott (3rd), Elmer O. Almy, Abraham Todras (2nd). ☆


A/C Chas. F. Buchholz


Col. E. H. Alexander


Lt. R. S. Miller

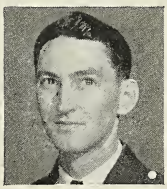

Lt. Perry H. Penn


Lt. Dorothy P. Shikoski


Col. James H. Walsh


Lt. Charles W. Byrd


Lt. Isaac W. Smith


Major E. W. Hampton


Lt. Col. Curtis Low


Lt. James W. Ingram


Lt. John W. Norvell


Lt. Allan P. Forsyth


Major Grant Mahony

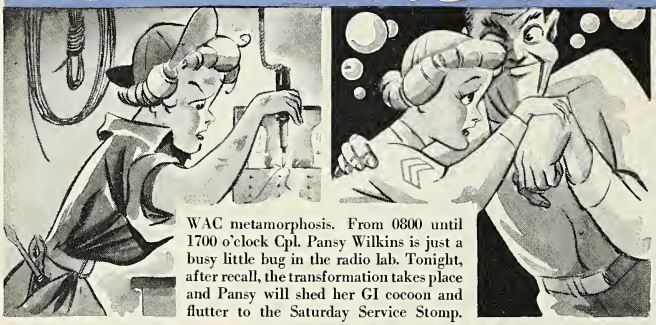

Sgt. Howard Cantor

WOMEN'S ARMY CORPS

WAC

US

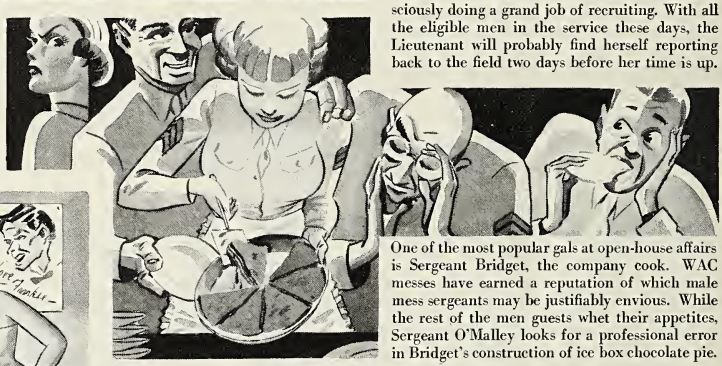
By Lieut. Wm. T. Lent



WAC metamorphosis. From 0800 until 1700 o'clock Cpl. Pansy Wilkins is just a busy little bug in the radio lab. Tonight, after recall, the transformation takes place and Pansy will shed her GI cocoon and flutter to the Saturday Service Stomp.

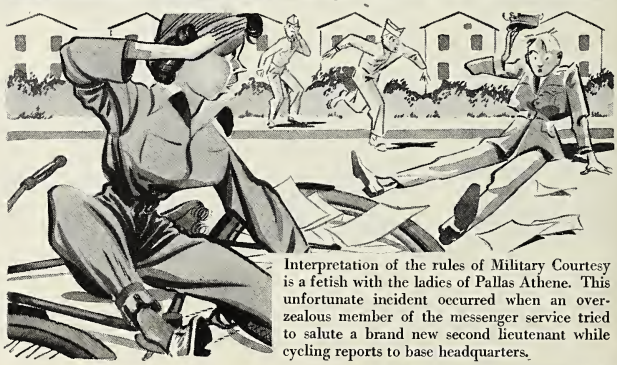
Lieutenant Sanders got her long-awaited furlough and here she is back in the old home town, unconsciously doing a grand job of recruiting. With all the eligible men in the service these days, the Lieutenant will probably find herself reporting back to the field two days before her time is up.

Brother, if you don't think the girls have some sharp drill teams, you're badly mistaken. Sergeant Johnson once led the chorus line at Radio City and now she pours precision close-order to her company with all the old showmanship.



One of the most popular gals at open-house affairs is Sergeant Bridget, the company cook. WAC messes have earned a reputation of which male mess sergeants may be justifiably envious. While the rest of the men guests whet their appetites, Sergeant O'Malley looks for a professional error in Bridget's construction of ice box chocolate pie.

Private Peters, ex-society deb, nurses a pair of tired tootsies (as yet uncalloused to the 30-inch step in service slippers) while her roommate struggles to take the bends out of her 8.2 cast-iron skirt.



Interpretation of the rules of Military Courtesy is a fetish with the ladies of Pallas Athene. This unfortunate incident occurred when an overzealous member of the messenger service tried to salute a brand new second lieutenant while cycling reports to base headquarters.

Notes on the AIRCRAFT WARNING SERVICE

Memo for Recognition Students. There is a difference in the terms "recognition" and "identification" of aircraft. When a plane is reported and plotted on filter boards it is known as a "target." This target must be *identified* as friendly or enemy. When aircraft is sighted by pilots or observers it is *recognized* as a particular type of aircraft, such as B-24, P-47, etc. Identification determines aircraft as friendly or enemy; recognition determines the types.

GOC and AWC. Two volunteer corps, each accorded official recognition by the Army, now serve the Army Air Forces in the Aircraft Warning Service in this country: the Ground Observer Corps and the newly designated Aircraft Warning Corps, whose members include filterers, plotters, tellers and supervisors who work for the fighter commands of the AAF.

Not Just Planes but Stars, Too. Members of the Ground Observer Corps in certain areas are assisting in the progress of scientific research in addition to their regular duties in behalf of the defense of the American mainland. In short, the Aurora Borealis is as eagerly looked for in certain localities as a Focke-Wulf, a Messerschmitt or a Dornier—and the anticipation is much more pleasant.

The National Geographic Society and Cornell University have asked the GOC to assist them in a research project concerning the Aurora Borealis, the purpose of which is to acquire data for the use of the armed forces in the field of radio communications. They approached the GOC because nowhere else in this country is there such a far-reaching organization already set up and in a position to report Auroras over such a wide territory. Observers who pursue this venture into the realm of astronomy will deal directly with Cornell University. (From the 1st Fighter Command's "AWS Volunteer.")

'Eyes Aloft.' On the west coast the 4th Fighter Command's network radio program, "Eyes Aloft" recently celebrated its first anniversary on the air. The half-hour show, dramatizing the activities of the Aircraft Warning Service and the 4th Fighter Command, is written and produced by Robert L. Redd and is heard over Pacific Coast NBC Monday evenings at 1830 PWT. Redd, who originated the show and Sam Hayes, veteran radio announcer and commentator, volunteer their time to the AWS for this job.

When the problem of recruiting new volunteers in the Aircraft Warning Corps became acute, Hayes used his vacation to fly up and down the west coast on a busman's holiday, speaking before crowds on the subject of the AWS and its importance in the war. He contributed his time and services to the Air Forces for this venture, and charged only for the vast quantities of aspirin he had to consume on his 14-day jaunt. He visited 14 different cities, made 72 broadcast appeals, 102 personal appearances and recruited more than 3,000 new filter workers.

Costume Jewelry. More than two tons of the costume jewelry collected by the volunteers of the Los Angeles Fighter Wing have been sent overseas to be used by AAF men in bartering with the natives. Pilots returning from Pacific zones tell of the aid a few pieces of this jewelry bring from the natives when flyers are forced down on a remote island.

Go Away. The usual down-to-business tension in AWS filter centers in the 1st Fighter Command, is relieved now and then by an incident worth a real chuckle. Recently a new volunteer in the Richmond, Va., center became flustered by the number of reports coming in to her position on the board. Instead of the orthodox, "Army, go ahead, please," the observer at the other end of the wire heard the plea, "Army, go *away*, please."

A New Convert. Among the Army's most resourceful men are the sector sergeants assigned to the AAF's Ground Observer Corps. They have to be, for not infrequently they run into snags that call for all the ingenuity they can muster. We have just heard about one such instance. A tale that is going the rounds of the 4th Fighter Command.

It seems that a particularly conscientious sector sergeant in the Los Angeles Fighter Wing thought it would be a fine, educational, morale-building idea for the ground observers to visit the Army's filter and information centers and actually see the complex operations that are set into motion by the observers' telephoned reports of aircraft seen or heard. Accordingly, he arranged to pick up in a GI carryall a certain number of volunteer observers from posts in his particular area every Monday night, take them first to the "Eyes Aloft" broadcast and then over to the Los Angeles Information Center.

Everything went smoothly for the first couple of weeks. Then one night an MP officer happened to be walking along Sunset Boulevard in Hollywood at the exact instant the sergeant drew up in front of the NBC studios to deposit his charges on the sidewalk—as many as could conceivably be squeezed into the carryall. The relations between a sector sergeant and his volunteer observers are, to speak conservatively, informal at best and on this particular evening the whole mise-en-scène was anything but military. The volunteers, most of them women, were clearly having a wonderful time. They called the sergeant by his first name, they assumed a definitely proprietary air toward the vehicle itself, and they shouted and screamed with glee as they all piled out of the machine.

The officer was brought up short by this slap-happy scene.

"Sergeant!" he shouted, "Don't you know it's a serious violation of the regulations to carry civilians in a government vehicle?"

"Yes sir," confessed the unhappy sergeant.

"Then I shall have to order your arrest."

"But, you see, sir," the sergeant protested, "these people are not civilians, they are *ground observers*."

The story has a true Hollywood ending. The captain, who turned out to be the Provost Marshal for a large AAF station nearby, followed the crowd into the studio, became fascinated with a phase of the Army hitherto unknown to him, asked to accompany the group on a cook's tour of the I. C. and later drove back with them to inspect their posts—the first he had ever seen. Like everyone who first discovers the AWS, he "got religion" where it is concerned, and not only did he encourage the sergeant in his weekly enterprise and issue instructions to his MPs in the vicinity that cars bearing ground observers were not to be questioned in the future, but now, every Monday night he brings his own carload of volunteers to the "Eyes Aloft" broadcast. ☆

Dead Planes

By Capt. Robert V. Guelich

How our engineers give all articles of captured enemy equipment a third-degree examination—and what they learn.

A captured ME-110 is given a onceover (top and left). Beneath the hood of the ME-109F (below) can be seen flame dampener exhaust stacks, prestone (large) and hydraulic (small) fuel tanks, 7.9 mm machine gun, and valves of the hydraulic system mounted on the fire wall.

Can Talk

In the early stages of the war, Germany captured much British and American-made equipment in France. Japan likewise captured wrecked American aircraft and other materiel in the Philippines. They had the first opportunity to learn that dead men can't talk but dead airplanes can and do. These early war losses contributed greatly to the enemy's knowledge of many of our aircraft secrets.

Since those days of Axis offensives, hundreds of Jap, Italian and German planes have been captured by the United Nations. We now are gathering captured enemy aircraft parts from all war theatres, assembling and testing equipment to learn what progress the enemy is making in aircraft design and development.

Because no one group of engineers is able to dream up all of the best aircraft developments all of the time, AAF engineers examine the most recent equipment being used by the enemy—searching for design and construction details that might be applicable to our own warplanes. From reports on these tests, technicians of the Materiel Command's engineering laboratories keep up-to-date charts of the progress of enemy aircraft development.

Commenting on the results of these continuing studies, Lieut. Col. John M. Hayward, chief of the technical data laboratory at Wright Field, states: "From thorough analysis of enemy equipment, we have learned that American equipment basically is superior to that of the enemy. Nevertheless, we do not claim an absolute monopoly on all of the best ideas. Our job is to recognize and use ingenuity and engineering ability of the enemy, weighing the benefits of engineering compromises in order to take advantage of the best available ideas."

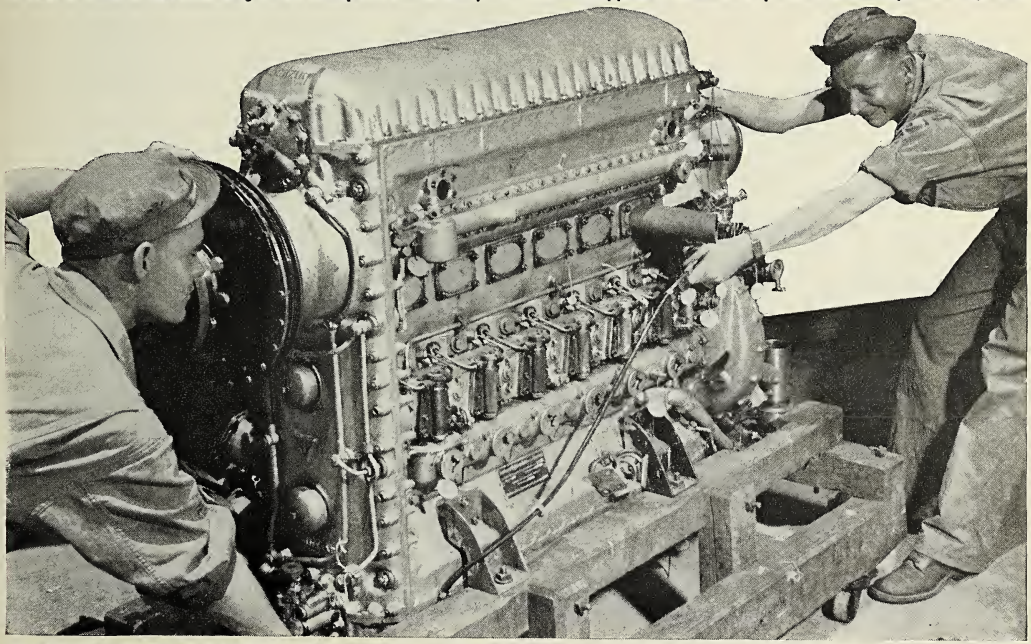
Since a story of the "bests" in all types of aircraft might read like a propaganda release—because of general superiority of American and Allied equipment — this article is intended to be a frank appraisal of German, Jap and Italian equipment with particular emphasis on that enemy equipment which is relatively new or which compares favorably with that being used by the AAF.

Here are some typical examples. When a German device was found to facilitate detachment of the propeller spinner for repair, it immediately was adapted for test on American-built spinners. German air filters have contributed to development of American filters. Despite the general inferiority of Jap equipment, one refinement discovered on a Jap automatic pilot has been applied to new American types. A Jap one-hitch parachute harness clamp also is being adapted for testing and possible use by the AAF.

Some of the devices incorporated in enemy aircraft are very clever, even though they may lack practicability in warplanes. Outstanding in this classification is a Rube Goldberg instrument panel found in an Italian plane.

Utilizing mirrors, prisms and lenses, the readings of the flight instruments are projected on a ground-glass screen which enables concentration of five instrument dials in a rectangle approximating 3 inches by 6 inches. Although not new in principle, this type of panel is impractical for a warplane because all of the projection equipment is extra weight and because our present instrument panels have been standardized and have proved satis-

This Jumo 205 German diesel engine is being taken into a test chamber at Wright Field. The engine is rated at about 600 hp and is used in some of the remaining JU-52 transports and in many of the Dornier flying boats, where they are installed back-to-back for tractor and pusher props. It is a six-cylinder power plant with vertical opposed two-stroke pistons and compression ignition.



factory. Instruments concentrated on the screen in the Italian plane are the compass, air speed, climb, bank and turn indicators.

Chrome plating and white enamel decorate the panel. (A flair for decorative touches is prevalent in most Italian equipment.) In another plane, the guns have chromium plated handle grips.

In comparing American instruments with those of the enemy, it has been discovered that Japanese instruments usually are lighter in weight than those in AAF planes although their performance is not comparable to American instruments under temperature, pressure and other variables. Nevertheless, some Jap copies have been found to be almost exact duplicates of American equipment.

Conclusion of one report on Jap flight instruments reads:

1. The ..... instruments have no new design features.
2. Jap instruments are much inferior to present American instruments in regard to performance.
3. In general, Jap instruments are about the same quality as those used in this country ter to fifteen years ago.

None of the more recent American refinements have been found on Jap instruments and very few have been discovered on German instruments, which, however, are of a more original design.

Plastic cases are being used by all countries to house instruments, except when metal sheeting is desirable on electrical instruments. The Japs have been using all types of metal, aluminum, brass, steel—apparently whatever was available at the time of manufacture.

To facilitate maintenance and repair, some German instruments have carried schematic wiring diagrams on the outside of the case, another instance of German attention to the problems of maintenance.

Propeller development has been a field for many innovations in Germany. The Nazis seem to enjoy developing complicated pitch change devices such as that of the Argus propeller.

In this propeller, which is made of laminated wood, pitch change is accomplished mechanically by the wind striking the fins of a windmill type of spinner. As the air speed increases, the rotatable spinner derives more resistance from the air and thereby increases the pitch. This propeller, only observed on 450 horsepower engines, appears to work satisfactorily on such engines. The Germans use no hollow steel propellers. Most are made of laminated wood, the rest of dural. The wood props have a cellulose acetate covering with brass or copper on the leading edge to protect the blade from chipping.

German propeller accessories are very good, being particularly designed for easy maintenance. Japanese propellers are mostly of a high quality dural and are almost exact duplicates of our older Hamilton-Standard props.

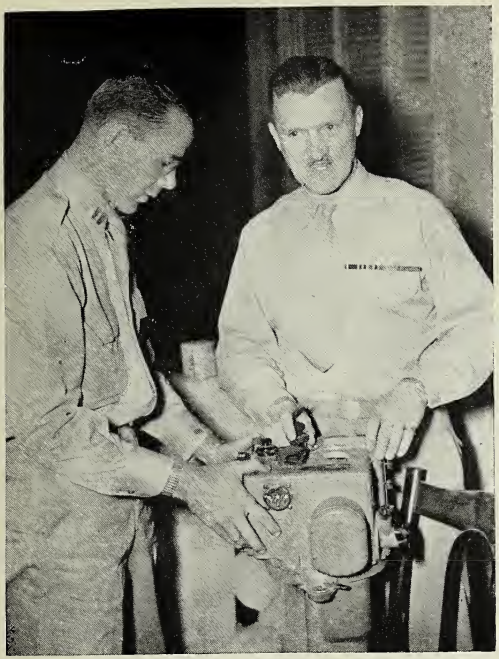
In the field of armament, the Germans are using very good guns and both Germans and Japs are using good ammunition.

The Mauser MG-151 20 mm cannon is one of the outstanding 20 mm aircraft cannons used in this war. It fires 800 to 900 rounds per minute—faster than similar guns originally installed in American warplanes.

Although the Japs and Germans are beginning to use 13 mm guns, they apparently continue to lag in development. Our .50 caliber machine guns are far better than the .30 calibers still used by the Axis nations. One of the only .50 caliber range guns in use by the Axis is an Italian Breda 12.7 mm. This appears to be a scaled-up

Firepower of enemy guns is tested at Wright Field. Weapons shown here include (left to right) Italian Breda 8 mm flexible machine gun (held by sergeant), Breda 12.7 mm (flexible), Breda 7.7 mm (flexible), German 7.9 mm (flexible), another Breda 7.7 mm, German Oerlikon 20 mm fixed cannon, Oerlikon 20 mm flexible cannon, two German MG-17 7.9 mm fixed machine guns, Jap 7.9 flexible machine gun and an AAF .50 caliber machine gun.

The pitch of these German Argus prop blades is controlled automatically by the ribbed rotable spinner which reacts with changes in air speed. Wooden-bladed, the prop is used on low-power engines.



Brig. Gen. Victor H. Strahm (right) and Capt. Selby M. Frank inspect a German bombsight—a Lotfe 7C type (Carl Zeiss), weighing about sixty pounds. It is crudely constructed, compared to the Norden, and the quality of stabilization—by electrical dampers—is doubtful. The optics, however, are especially fine.

This is an 840 hp, two-row, 14-cylinder, radial air-cooled Italian Fiat engine. It has a geared supercharger and is used to power such planes as the Macchi 200 fighter, the Fiat G-50 fighter, the CR-42 biplane and RS-14 bomber-reconnaissance seaplane.

version of the Breda 7.9—a modified Vickers Mark I. It is a little more than a .30 caliber gun doubled in size with little redesign of the internal mechanisms. The powder capacity of the shell is about one-half that of the American .50.

The Oerlikon 20 mm, used by Japs and Germans, is fairly light in weight but is believed to have a slower muzzle velocity than comparable American guns. The Jap 7.7 mm gun is a copy of a British Vickers used in the last war.

Although not used in aircraft, it is interesting to observe that Italian and Japanese .25 to .30 caliber ammunition has been found using a hard wood projectile which appears to be effective at short range.

Turret development of the enemy appears to be far behind that of the United Nations. The Germans have sent some rather ineffective looking semi-turrets into action, some of which are operated by remote control. The Japs seem to be depending upon the Lewis and Vickers Model 3 flexible mounts.

Captured bombsights have been generally good but not comparable to our best. Of the German Type 7-C, built by Zeiss, the Materiel Command report reads, "This type bombsight contains nothing in nature of design which would be an improvement to our system." A Jap Nikko bombsight from a Mitsubishi Type 96 Navy bomber shot down near Darwin was reported to be very similar to the French Bronzavia Devaud Type D-30 bombsight.

Enemy aircraft engines of all types have been captured and returned to Wright Field for careful analysis and rigid testing. They include such types as the German BMW-801, the DB-601, the Bramo Fafnir, the Jumo 211, the Italian Fiat, the Jap Kinsei 44 and many others of more recent manufacture.

GENERAL procedure is for an engine, such as the BMW-801A, to be torn down by power plant engineers. Specialists from American aircraft engine manufacturers then may be called in to examine the fuel injection system, all construction features of the engine—such as provisions for maintenance and repair—and every nut, bolt and gear that goes into the engine.

Upon learning whether or not there are any new features in the engine, it is reassembled and put on a dynamometer test stand to determine its power output. From this and subsequent analyses, reports are prepared and distributed to all interested parties to enable them to evaluate progress of our enemies in designing and fabricating warplanes.

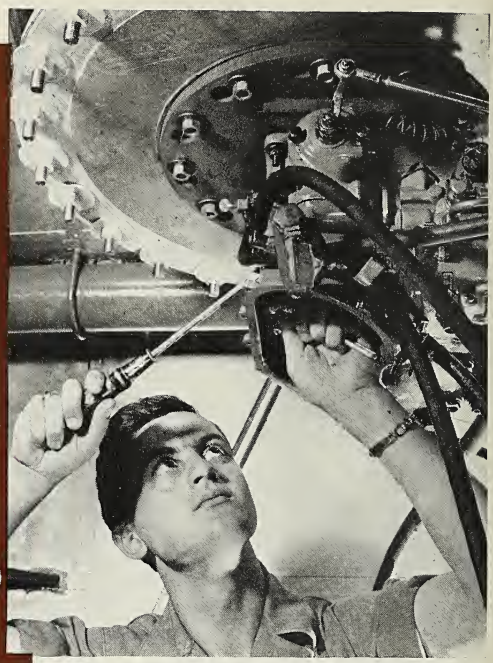
These laboratory examinations have proved that American equipment is generally superior to that of the enemy. In those few cases where an Axis-made engine reveals a new idea or a better type of material being used, our engineers are quick to improve AAF equipment.

When Wright Field received its first ME-109, six mechanics who knew nothing about German airplanes removed the engine completely in less than twenty minutes. Since that was far less time than is required for removal of American fighter engines, our engineers began to incorporate some of the German ideas in our new power plants. One of the major installations that facilitated rapid removal of the power plant was the concentration of all wiring and fuel connections into a small number of sockets.

From other ingenious methods used by the Germans in mounting their engines, AAF engineers have been able further to simplify engine installations in some U. S. planes, thus facilitating removal of the engine for overhaul and repairs.

The Jumo 207 diesel engine, used in the JU-86P medium bomber, is a tall, slim, in-line engine with opposed pistons that appear to be designed for use at very high altitudes. A bomber with this type of engine has been observed above 43,000 feet over England. *(Continued)*

This aerial camera, similar to the American K-17, was taken from a captured German plane. It is believed to have been manufactured in Czecho-Slovakia. The German lenses are exceptionally fine.



A Jap duplex carburetor is shown being installed in an "air box" at Wright Field for testing under flight conditions at a wide range of temperatures and altitudes. This carburetor, from an engine of about 1,200 hp, was found to be inferior to U. S. types in altitude and load compensation tests.

Another interesting German development is a blower fan on the 1600 hp BMW-801 radial engine. The fan, attached to the propeller hub, forces cool air through carefully designed channels around the cylinders. It revolves approximately two and one-half times as fast as does the propeller to provide efficient cooling on the ground, during climbs when speed is reduced, and at high altitudes. The new principle already has been tried out on an AAF medium bomber.

German engines usually are slightly heavier with an output (per unit displacement) less than that of our engines.

Japanese engines are little more than conglomerate copy of American, British and French engine designs. Pratt and Whitney engines appear to have been the models copied most extensively. Although the Japs have copied our engines, they are getting additional horsepower out of the same engines because they have built them to closer tolerances. However, these engines are copies of types no longer used in our combat aircraft.

The power plant laboratory of the Materiel Command also analyzes fuels and self-sealing fuel tanks.

Of an Italian self-sealing fuel tank, tested in February, the report reveals that two .30 caliber rifle shots caused the tank to leak a stream approximately one-sixteenth of an inch in diameter from both exits. One .50 caliber ball tore a hole approximately 1 inch by 2 inches which remained gaping, showing no sealing characteristics.

FROM some of the more recently shot-down Jap aircraft, sections of rubber and corrugated paper have been found fastened externally to fuel tanks as attempted protection of the most vulnerable parts. These sections are held in place by a wire frame. Tests of the material, however, show that the crude device does not meet American requirements.

German bullet-sealing tanks, on the other hand, are of very high grade materials and first-class workmanship. Tanks obtained from recently captured aircraft are almost identical to those used in American planes.

A test of gasoline from a Jap plane that crash landed in New Guinea showed that it approximated a ninety octane fuel except that the gum and copper dish residue was relatively high.

In the aero-medical laboratory oxygen equipment from the Axis nations has been thoroughly tested with the findings that the German systems are the best of the Axis while American oxygen equipment proves more reliable and more efficient than any Axis-made mask or regulators. The lag in Axis development of good oxygen equipment is believed to be a retarding factor on their bid for high altitude equality with the Allies.

Japanese oxygen masks have been very crude, covering the mouth and nose like a small muzzle without any apparent attempt being made to obtain close fits into the various shapes of pilot faces. The German oxygen units are well made and provide much better fittings.

The constant oxygen supply system still is being used by the Japanese while both American and German systems are of the demand type.

With most other nations, Germany and

Japan are using high pressure oxygen cylinders. AAF systems, however, have been changed over to low pressure to reduce the danger of oxygen explosions when the cylinders are struck by shells or anti-aircraft fragments.

Radio equipment used by the Germans is far superior to that being used by the Japanese and compares favorably with that used by the Allies. Nazi equipment has an extensive range with excellent reception. The Jap radio units are made of poorer grade materials, resulting in lack of range and effectiveness. Many of the Jap ships shot down have not been equipped with any radio.

Photographic equipment of the Germans generally is larger than that being used by the AAF, although, through the extensive use of magnesium, the weight is approximately the same. Preliminary aerial photographic tests have indicated that the German film is slower than that we use.

German lenses, on the other hand, continue to be exceptionally fine. Accessory parts of the Nazi cameras are not of the same quality as those used by the AAF, although they appear to have been manufactured by methods not adaptable to mass production.

The Japanese cameras are carbon copies of the Fairchild K-10, which has not been purchased by the AAF for over ten years.

Clothing for air crews generally is of good materials and good workmanship in all countries. Poorest quality clothing is that used by the Italians. Japanese outfits are of good materials and workmanship but usually are not of the most efficient designs. Nazi flight apparel is of the best.

A Nazi electrically heated suit, as an example, is lined with a plush material and the outer material is of cotton twill. This is the coverall. The wired suit is a two-ply silk trico with sewed-in wires. Fourteen nickle-steel zippers enable the pilot to shed the suit easily.

The Jap-type electrically heated suit is made of a poorer quality material—both leather and lining—and uses a simple wiring system. A detailed diagram on the inside of the Jap pilot's clothing suitcase shows how repairs of the wiring may be made and this idea is being considered for adoption with American outfits.

The Jap electrically heated boots are warm but are very stiff and uncomfortable, being made of a cheap grade of leather.

From Wright Field's morgue of enemy equipment have come volumes of interesting reports about the Axis. For instance, Japanese parachutes have been received and examined, disproving the reports that no Jap pilots wear chutes.

The Germans evidently have been well-supplied with magnesium and aluminum throughout the war. On a two-engine JU-86 almost 600 pounds of magnesium was used in this airplane. An unusual parachute dive-bomber brake on the tail of the DO-217 bomber has been studied to ascertain the advantage of this German invention.

The pilot's safety belt in the ME-109 was found to be more comfortable and easy to adjust even after wet through by rain.

German engineers have pioneered in the use of hot air for de-icing the leading edge of the wing. From a JU-88 bomber an entire wing section was thoroughly examined by Wright Field and by the California NACA laboratory. The heat exchanger around the exhaust manifold collects the heat, which is then piped through the leading edge of the wing to a point near the ailerons where it is exhausted.

Since examination of this wing section, hot air de-icing installations have been made on practically every type of combat and cargo airplane of the AAF. Only recently Lockheed reported that hot air de-icing would be used for the wings of its second and third C-69 (Constellation type) planes.

From such examinations of captured enemy equipment by the laboratories of the engineering division of the Materiel Command has come a wealth of information about the enemy's ability to produce aircraft and equipment.

When Wright Field completes its investigation, the equipment is made available to aircraft manufacturers who are interested in enemy design and assembly methods, and to other aeronautical research laboratories in this country.

Every article of captured equipment is put through third degree examinations until the airplanes literally "squeal" to the men who are designing our warplanes. ☆

This German pilot's suit is of two-ply silk trico fabric with interwoven electrical heating wires. Outer garment is a plush-lined cotton twill coverall with electrical connections for the gloves and shoes. It has fourteen zippers and they are of nickel-steel.

VARIETY is the spice of life. Accordingly, this month we coaxed our camera away from the nose of a plane and snapped this rear view of a P-47.

Mishandled repairs can occur on any part of an airplane as shown by these empennage fixers. There are six boners in this photo, listed on Page 56. Are there any we missed?

Topnotch mechs always bear in mind that the airplane not only must fly, but also that it must fly *reliably*. To achieve this is a solemn responsibility ON THE LINE.

To show how it shouldn't be done this picture was posed by members of the Air Service Command's 315th Depot Repair Squadron, Patterson Field. They are Pfc. William Ramsey (left), Pfc. George Kirkendall and Pfc. Edward W. Kerscher (top).

ON THE LINE

A monthly maintenance roundup prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

Hints on Hand Tools . . .

Recall the old wheeze about throwing a monkey wrench into the works? That's just about the equivalent of using a Stilson wrench on surfaces that require an open end wrench. Stilson wrenches were designed primarily for the general purposes of plumbers—not aircraft mechanics—so take the time to get the right wrench out of the tool box and if it isn't there go to the stock room for it.

Which gets us around to the matter of using hand tools. Improper usage results in damage to parts as well as to the tools, and makes for slim chances of proper repair.

Choosing too large a lever to tighten ignition plugs can break them; use the torque wrench to get the right tightness. Tightening or loosening with too large a wrench will round the corners of a nut, making it difficult to remove the nut at all. This then means cutting it or forcing it off with a special device, necessitating replacement with a new nut. In similar maltreatment of a screw, using the incorrect screw driver will probably throw a burr on the edge of the slot.

There is one positive precaution to avert these needless troubles. And that is *read the TO*. For every airplane, for every service procedure, a TO has been carefully written. It tells what tool to use and where to use it.

Lowdown on Winterization . . .

Since a winterized airplane can operate anywhere, nomenclature can be misleading. Winterization is a term referring to the preparation of a plane or its equipment so that operation will be satisfactory within a temperature range of from 65 degrees below zero to plus 160 degrees Fahrenheit. Extreme temperatures naturally affect the operation of oil system, fuel system, power plant, controls and other important parts of the airplane, and it is necessary to guard against improper functioning. During the winter extremes of temperature present severe problems which make servicing more complicated than in summer months.

The first essential is to see that all parts are lubricated with oils and greases which are satisfactory at all temperatures encountered, and in accordance with current practices, winterized airplanes should operate satisfactorily in *any* theatre. That is, present winterization processes make planes adaptable to any climate. However, certain exceptions require special equipment for extremely low temperatures, such as providing special snow and ice tires, form-fitting covers to keep ice off wings, de-icer boots for wings and tail surfaces and internal combustion type heaters to provide heat in passenger compartments of transport airplanes.

It is imperative that mechanics servicing airplanes destined for extremely low temperatures become thoroughly acquainted with the general requirements of TO 00-60-3. It describes in detail methods of cold weather ground warm-up, cold weather starting and stopping of airplane engines, and explains the problems facing mechanics servicing planes in the arctic.

Saved from the Boneyard . . .

As a result of the ingenuity and industry of its crew chief, Staff Sgt. Anthony

P. D'Andrea, an observation airplane forced down near an Antilles Air Command base and marked for the boneyard has been restored to flying status.

Crew Chief D'Andrea first trekked six days through swamps and dense foliage to reach the crash scene at a mud flat near Paramaribo, Surinam. With the aid of native labor, a short runway of chicken wire and scrap lumber was improvised and the plane jacked laboriously out of the mud. From this makeshift runway veteran jungle flyer Capt. Charles Ross volunteered to fly the plane out. He got it away and landed at a nearby airbase.

Back at its home base the craft was grounded for a complete overhaul, and the only usable parts were the wings, instruments and metal struts of the fuselage. Sergeant D'Andrea then began his tedious task of rebuilding it. Using materials available at his South American jungle base, he completed a major depot overhaul job, virtually taking the plane apart and putting it together again with new parts.

A plane once given up for lost is now back in service, being used for reconnaissance flights, rescue work, aerial photography, short shuttle service and similar missions.

Hats off to another job well done by mechs of the Army Air Forces.

Don't Swing That Thing . . .

Hoisting at an angle or not centering the crane above the object to be lifted tends to cause swinging of the piece being raised. This may result in damage to valuable equipment or injury to personnel, or both. First adjust your crane so that it is centered exactly before starting the hoist. Take a look at AC Circular 130-2.

Spreader Bar . . .

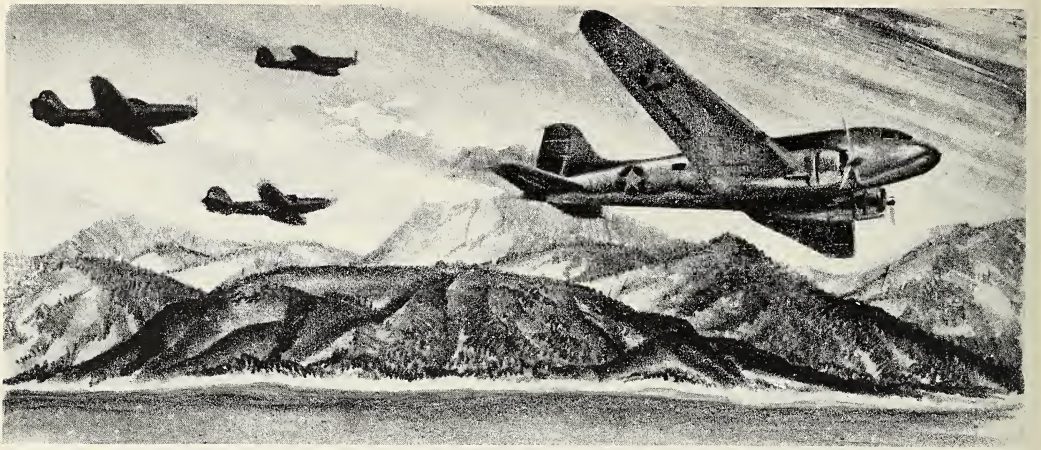
When an engine is left on a type A-2 frame, be sure to install a spreader bar. Failure to do so will result in bending the A frame at the fulcrum point and endangering personnel in the event of a collapse.

It Won't Hold You . . .

Cowling support frames are designed to keep the cowling in place and are not stressed to hold the weight of a mechanic. Keep this in mind the next time you're working on an engine, mechs.

Jack Safety Nut . . .

Safety nuts are to be screwed down on airplane jacks when in use. See TO 19-1-18. ☆



THE BANANA RUN

By Sgt. James Winchester

AIR TRANSPORT COMMAND

WE walk from the Brownsville operations office through the warm Texas night to a cargo-laden C-47.

Out of the shadows troop an assorted group of officers, enlisted men and civilians ready for the Brownsville-to-Panama hop. The pilots sometimes call it the "Banana Run."

Blue-striped foreign military cargo is stowed high along one side of the luxury-stripped cabin. Mail bags, carrying thousands of letters and packages to our men in the Caribbean area, fill the rest of the space, leaving only a narrow aisle, barely wide enough for the crew to squeeze through with their map cases, down the center.

The job ahead is just another day's work for pilots like Capt. Bill Betts. But looking at their job as a whole, it is an important cog, not only in supplying of cargo and mail to our vital Caribbean defense outposts but also in the training of newly graduated aviation cadets who, in a few brief weeks of concentrated training, are transformed into capable and efficient Air Transport Command pilots.

Coming down the aisle of the plane behind us, as we inch along between the cargo, is one of these transition students who is making his first run over the route as an observer. Later he will fly its 2,000-mile length on two round trips as co-pilot before leaving the transition school and going into an operational training unit for final polishing.

This one is Lieut. Richard Wagner, who is fairly typical of most of the boys coming into the command for their transport pilot training—young, aggressive and eager to do his part in what he thinks is the best possible way, flying the freight. Some guys like the fighters and some like the bombers, but for these boys there is something in the thought of a big cargo plane winging its way through the night across a black ocean that makes their pulse beat a little faster.

This Lieutenant Wagner, for instance. He had wanted to fly for a long time and had indicated he would like to be a transport pilot, so his future training was planned to lead him up to that goal. He went through the regular curricula of the aviation cadet program before he received his wings, but he'd never been in the cockpit of a twin-engine airplane until he arrived at Brownsville from the ATC's reception center. At Brownsville his training in the intricacies and problems of air transport flying really began.

For the first three weeks, he had large doses of work thrown at him from every angle. He spent hour after hour making landings and take-offs in a twin-engine C-47. Under the able guidance of a contract carrier pilot instructor he learned to know the instrument panel of the C-47 until he could shut his eyes and name the position of every dial on the board, how it worked and what it was used for. He learned that there is a lot of difference in flying a twin-engine transport and a single-engine trainer, and most important of all he learned that he hadn't yet started to learn all there was to flying.

In case Lieutenant Wagner or any of his fellow student pilots should ever be confronted with engine trouble aloft, a large portion of their transition training in Brownsville was devoted to practice and procedures in how to take care of such situations. Day after day they were taken up to practice flying with one engine cut out. They learned to feather the prop, trim the plane and do a score of other things necessary in operating on one engine. They learned the sounds of engines so well that they could recognize trouble almost before it happened.

They learned the importance of checking every single piece of safety equipment aboard a plane before takeoff. And the student pilots really appreciate this lesson when they look down from the safety of 10,000 feet into the mountains and jungles they fly over during the latter phase of their training and think

ILLUSTRATED BY LIEUT. WILLIAM T. LENT

ATC student pilots get their first taste of real transport flying on this Brownsville-to-Panama hop.

of the many things that might happen.

The trip south for Lieutenant Wagner is the beginning of the end of his training. Like most of these transition student pilots, he has never been out of the United States, and there will be plenty for him to see and observe on this trip south of the border—things that can't rightfully be called "training aids" under the strict interpretation of the military but that, nevertheless, are equally important in molding the new pilots.

Before leaving Brownsville, Lieutenant Wagner has been instructed in the rules of behavior for military personnel in the Central American area. Four rules stand out:

1. Don't exhibit firearms in public.

2. Don't whistle at girls in the street. 3. Obey all local civilian laws and ordinances. 4. Be properly uniformed at all times.

So several hours and some thousand miles later, when the wheels of his plane roll to a stop at the end of a runway hacked from the middle of a dense coastal jungle, he's ready to forget those months of tedious training back in the States—at least for 24 hours, until he picks up his bag and map case the next day to take the second leg of the flight on to Panama. They will stay overnight at a jungle field and fly back on the following day to this same airport, where they will lay over for another 24 hours before returning to Brownsville.

In all, four days are required for each crew to make the round trip from Brownsville to Panama, and it is the policy of allowing these 24-hour breaks in flying time that is largely credited with the enviable operation record that has been established over this route. Since its inception every scheduled flight has been completed and not a life or plane has been lost.

The "coke" bar, located in the operations office at this jungle airport, is one of the Army's smallest, yet busiest PXs. Its counter is less than seven feet long and its principal stock in trade is a huge refrigerator, but this PX does a monthly business of better than $900 which comes mainly from these ATC pilots and the passengers on their planes, both north and southbound. Lieutenant Wagner is joined at the bar by three of his Brownsville buddies, also there for their 24-hour layover.

Like youths everywhere, in or out of uniform, get more than two of them together and they will go looking for a pretty ankle. Pretty ankles being scarce at this jungle airport, it is no effort at all to make the decision to ride an Army truck up a mountain trail to spend the night in a cool cosmopolitan Central American city.

Truck travel in the jungle not being designed for passenger comfort (one pilot is reported to have made the rest of his observation flight standing up after completing this junket to the high country), a sergeant undertakes to relieve the monotony of the journey. His approach is direct and to the point. Three minutes from the field he begins to riffle a worn pack of cards with practiced fingers. Too rough to play cards on any flat surface, if there had been any flat surface, he proceeds to initiate the new lieutenants into the mysteries of a game known as "Esquintla Showdown" and taught him by a couple of native soldiers in a town by that name. It's a simple matter. You deal seven cards to each player, who holds them tightly in his hands so they won't be shaken loose when you hit a bump, which is on the average of three bumps to each complete revolution of the wheels. Aces, deuces, one-eyed jacks and the card that had a corner torn off in some previous GI struggle are wild. Best five cards out of the mess collects a quarter each from each of the other players. You'd be surprised how it makes the time—and money—pass.

In the town, high in the mountains, even in the middle of summer two blanket at night are welcome. Here leather goods can be purchased for a fraction of their cost in the States and it's a rare pilot indeed on this run who doesn't have a pair of Guatemalan boots, a Guatemalan leather map case and a native belt. Here, too, pretty ankles are more common than in the jungle. But Lieutenant Wagner's best remembrance of the city is the sign over the slot machines in the local officer's club:

"In case of an air raid stand here; these machines have never been hit yet."

By ten o'clock the next morning, Lieutenant Wagner and the others are off from the jungle airport for the six-hour run down the long neck of Latin America to the Canal Zone. With one stop for refueling, this leg of the trip passes over some of the most beautiful country in the Americas—towering mountains, volcanic lakes and miles of sandy shore line.

As the transport approaches Panama, interceptors come up out of jungle airports to inspect the ship and from then on until the end of the trip crew and passengers alike are given a first-hand show of the care with which Uncle Sam guards his approaches to the Panama Canal.

The trip home is just a repetition of the run south, except that passengers are hauled instead of freight and mail—officers and soldiers returning home on furloughs, passes, transfers, most of them for the first time in two or three years. In fact one wag in the waiting room at the airport in Panama has penciled an arrow pointing to the loading door and underneath it written, "This way home!"

Back in Brownsville, Wagner sums up his impressions of this first run of many he will make all over the world in ATC planes.

"It's a wonderful experience," he comments, "not only because of the country and various types of weather you are able to observe and fly over, but also for the sobering and steadying influence you get from the thought that here a mistake doesn't just mean another hour of classroom study, more likely it will mean a couple of weeks hacking your way out of some jungle, fighting mosquitoes and snakes and tropical fevers. If I learn nothing else here that lesson itself will be forever valuable to me—an ounce of prevention on the ground is worth a pound of cure in the air."

In a few months he'll probably be as blasé about flying from Miami to India as he is about shaving himself in the morning but right now he is a pretty excited guy. ☆

WHEN GREETING AN ESKIMO SAY, "Eye-yigh!"

THE Eskimo may seem enigmatic to us. For all his stolid appearance, he is keen about sports and merriment. He can be friendly and loyal, but he can also let a man freeze to death or starve if he doesn't like him. Friendliness and firmness are the two qualities you'll need to deal successfully with the Eskimo. Above all, even the smallest knowledge of the Eskimo language will work wonders in winning his friendship.

With the first word you speak, an Eskimo will size you up as an outsider. He won't expect you to understand a flow of language and will probably talk to you in single words and short phrases. But he will be complimented and inclined to friendliness if he hears you trying to speak his langauge. He may even grin broadly and shake hands enthusiastically. Be friendly in return.

The Eskimo language is difficult to learn. A white man can't hope to speak it well without living for years in the Arctic. It is, for the most part, a *spoken* language. The Eskimos have found it possible to carry on their lives, to hunt and fish and travel successfully, without writing their language. They have devised no alphabet of their own. The words and phrases which appear in this "lesson" and the word-list that follows are used throughout most of the Arctic — from Greenland and Labrador westward through northern Alaska. The language spoken in Alaska south of the Yukon, and in the Aleutian Islands, is quite different, however. It resembles more nearly the language of the British Columbian Indian tribes.

The Eskimo words and phrases in this "lesson" are spelled out in a simplified system which represents the language as it sounds in English. The system contains letters for all the sounds you must make to be understood. The English spelling used here comes as close as possible to the proper sounds to help you pronounce the words easily and correctly. For example, take the Eskimo word for walrus. This word has been spelled *iviuk* and *aiviuk* by explorers, but no one can tell from these spellings what the Eskimos call the animal. Actually they call it the *ivy-uck*—the plain English word *ivy*, plus the syllable *uck*, which rhymes with *luck*. Even if you should pronounce the word to rhyme with *nook* or *spook*, it would still be understandable.

When you meet an Eskimo, you probably will say, "Hello," and the flat-faced, fur-clad man may even say something like *"Har-low"* in return. If he doesn't understand your word, he'll understand your facial expression and extended hand, at any rate.

The greeting auk-shun-EYE is in use in Labrador and on Baffin Island. It means something like "how do you do?" In Hudson Bay, the most common phrase of greeting is CHIME-oh, meaning about the same thing. But there are parts of the north country where no greeting beyond an explosive eye-YIGH is used.

The ideas you will want to put across to an Eskimo will have to do mainly with such essentials as food, water, shelter and the like. The chances are you'll be hungry wherever you are, whatever the season, so you must know the phrase kah-POONG-ah, which means "I am hungry." Don't pronounce the *g* strongly. Pronounce it about as you do in ping-pong. Kah-POONG-ah is composed of parts of the words, KAH-pok (hungry) and oo-VUNG-ah (I).

The pronoun oo-VUNG-ah (don't pronounce the *g* strongly) can be combined with various adjectives to express how you feel. The resulting phrases are not grammatical, but they are readily understandable and are much more pro-

PREPARED BY THE ARCTIC, DESERT AND TROPIC INFORMATION CENTER

nounceable than the strictly correct ones:

Oo-VUNG-ah ICK-key—I am cold.
Oo-VUNG-ah quawk—I am so cold I am freezing.
Oo-VUNG-ah COW-shook—I am wet.

The pronoun meaning "you" is IG-vee. So IG-vee ICK-key would mean you are cold or are you cold, according to the inflection of your voice. Now for a few phrases using the pronoun IG-vee:

IG-vee pee-oo-YOOK—You are good.
IG-vee COW-shook?—Are you wet?
IG-vee oo-AIR-nook?—Are you sleepy?

If you need something, you will use the phrase pee-you-mah-VUNG-ah, meaning I need or I want, together with some noun, which is the name of the thing you need. Again these phrases are not strictly correct Eskimo, but they will serve to put your ideas across:

TEE-mik pee-you-mah-VUNG-ah — I want some tea.
EE-mick pee-you-mah-VUNG-ah—I want a drink of water.
NER-key pee-you-mah-VUNG-ah — I need food.

KING-mit pee-you-mah-VUNG-ah—I want dogs.
COMMA-tick pee-you-mah-VUNG-ah — I need a dog-sledge.

If the Eskimo brings you what you want, you will want to thank him. Your new-found friend will appreciate the courtesy, for he himself is polite, no matter how uncivilized he may appear to be. So here's a phrase of thanks:

Koo-yah-nah-MICK—Thank you.

The things you will be likely to need will have to do with clothing, equipment and food. Here are some names you should know:

COM-ic—boot
KOOL-ee-tock—blouse or parka
AH-no-wah-ga—clothing
IG-loo—snowhouse
PAH-na—snow-knife
KOO-di-lick—seal-oil lamp
COMMA-tick—dog sled
EE-ko-mack—matches or fire
COOKY-oo—gun
TOO-peck—tent
NER-key—food
OO-me-ack—boat

Both oo-VUNG-ah (I) and IG-vee (you) can be combined with verbs to express simple ideas. Accurate Eskimo verb forms are exceedingly complex so about all you can hope to use is the verb-stem combined with pronouns. Here are samples:

Oo-VUNG-ah OWD-lah—I am going (the OWD rhymes with crowd).
Oo-VUNG-ah tah-KOO—I see it.
IG-vee KAH-pock?—Are you hungry?
SHOO-nah IG-vee NERRI-wah? — What are you eating?

If you want to stress the idea *your,* you may add the simple word IG-vee to the noun. Again the resultant phrase is not strictly correct, but the Eskimo will understand you:

IG-vee IG-loo—your house

IG-vee KING-mick—your dog
IG-vee PAH-nah—your snow-knife

Suppose you want to ask where something is—a lake, river, or house. The important word *nowk* means *where.* Pronounce the *ow* as in *now.*

IG-loo nowk?—Where is the house?
IG-loo IG-vee nowk? — Where is your house?
COKE nowk?—Where is the river?
Kab-LOON-ah IG-loo nowk? — Where is the white man's house (or trading post)?
COOKY-oo nowk?—Where is the gun?

The idea of bigness is expressed by the addition of *ju-ak* to familiar words. Listen closely for such lengthened words. Thus:

Ee-MACK-ju-ak—big water, ocean
Oo-mi-AK-ju-ak—big boat, ship
Ig-LOO-ju-ak—big house, trading post

The idea of smallness is expressed by adding *at-suk* or *ah-pick* to words. Thus:

KING-mick-AT-suk—little dog, puppy
IG-loo-AH-pick—little house, kennel

You should know a few human interest words and phrases for use when you meet the family:

AHNG-ot—man
AHNG-e-nook—woman
NOO-tah-rock—baby
AHNG-o-ti MAR-ick—real man, he-man
AHNG-e-nook mick-i-OO—little woman
NOO-tah-rock pee-oo-YOOK—good baby

Knowing the names for a few parts of the body will help. Most of these are easy to remember because they're short:

KING-ahk—nose
Nee-AH-coke—head
Key-OO-tit—teeth
AHG-sah-eet—hands (literally, the fingers)
IT-i-gut—feet

You will want to say *yes* and *no,* of course. There are various degrees of these ideas:

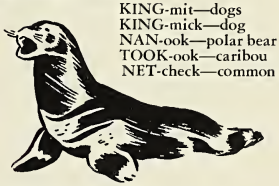
Ah-high-LA or AH-me-la—yes
Ak-shoo-AH-look—yes, indeed!
AH-guy—no
NAH-gah—no, indeed!

The weather is a good topic of conversation the world over. It is of real importance in the Arctic:

SEE-lah—weather
SEE-lah pee-oo-YOOK—good weather
AH-no-way—wind
AH-no-way pee-YUNG-i-took—bad wind
AH-no-way AH-mish-oot—much wind
AH-no-way AH-mish-oot oo-BLOO-me — much wind today
AH-no-way AH-mish-oot AH-kah-go — much wind tomorrow
ICK-key—cold
ICK-key AH-kah-go EE-mah-kah—cold tomorrow perhaps
CONN-neck AH-kah-go—snow tomorrow

You should know the names of certain Arctic animals, too. The Eskimos use these nouns often:

KING-mit—dogs
KING-mick—dog
NAN-ook—polar bear
TOOK-ook—caribou
NET-check—common seal



OOG-zhook—hair seal
Kelly-LOO-gak—white whale
EO-kah-look—salmon trout
MIT-tuck—eider duck
Ah-HIG-i-vik—ptarmigan
OOK-pick—snowy owl
NERD-look—Canada goose

You'll need a few everyday expressions for use in travelling, working, hunting and the like:

TOOK-oo-roo!—Look at that!
TIE-mah — It's done. The job's finished. Let's quit.
AH-tay!—Go ahead now. Get going!
Watch-AIR-oh.—Wait a bit.
Mah-nah—Now
OWK! or HOWK! — To the right (dog driver's term)
OWK-ah! or HUH-dah!—To the left (dog driver's term)
KI-geet!—Come here! (pronounce the *i* as in *mice*)
KI-sah-geet!—Bring it here!
SEE-ko—Ice
CONN-eck — Snow (especially when it's falling)
SHEE-nah — Ice floe (open water at the edge of the ocean ice)

Before you leave your friends, you may wish to say more than koo-yanna-MICK, "thank you." Perhaps you'll say:

IG-vee pee-oo-YOOK—You are good.
IG-vee-lo AHNG-e-nu-lo pee-oo-YOOK—You and your wife are good.

(Note that the syllable *lo* is added to both words when the two are joined with *and.* Thus the expression for snow and ice would be SEEK-ko-lo CONN-neck-lo.)

IG-vee NER-key pee-oo-YOOK — Your food is good.
Tug-VAH-oo-tit!—Good-bye! ☆

SYNTHETIC DEVICES

Map Projection Models. In navigation training with wall charts as the only aid, students experience difficulty in grasping the third dimension factor.

Three-dimensional map projection models have been developed to overcome this training handicap. The spherical earth is simulated in a plastic hemisphere with red meridians of longitude and blue parallels of latitude. The surfaces on which points on the world sphere are projected are sheets of transparent plastic. Lines running from the center of the world sphere to the points at which meridians and parallels meet extend to the plastic sheet to represent projection lines.

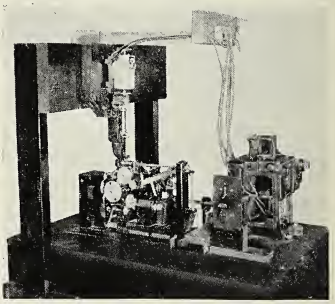
The student thus may be shown clearly the method used to locate on a chart or map points corresponding to those on the surface of the earth.

The set of four models is designed to demonstrate the fundamental principles of Mercator, Gnomonic, Conic and Lambert-Conformal projections.

Mercator Projection

'Expanded' Computing Sight. The extremely compact construction of the Sperry Automatic Computing Sight is an asset in the close confines of aircraft turrets, but to trace the internal movements of the sight's several gear trains through the closely knit maze of shafts and gears is difficult for new students of sight maintenance.

Accordingly, a standard Sperry K-3 Sight was "cross-sectionalized" by the armament school work shop at Lowry Field, Colo., to make the working model shown in the photograph. The mechanism was "expanded" to provide the student an easy way to follow the movements of the various shafts and gears.



The computer assembly has been removed from the optic mechanism and further separated into sub-assemblies.

The shafts and gears related to each gear train have been painted a distinctive color, so that their motion can easily be followed throughout any operating movement of the sight.

The sight's own 27.5-volt DC motor is utilized to provide the driving power, affording the student both correct operating speed and a wiring harness to trace for proper maintenance.

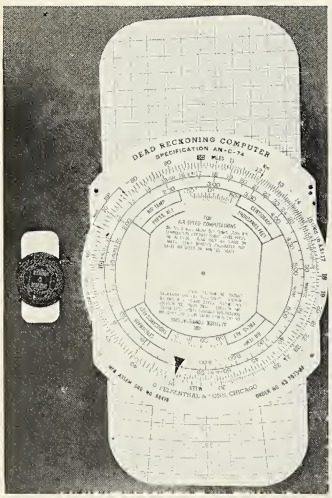
Certain groupings of gears and cams normally hidden from view have been revealed by cutting away portions of the outer case of the sight.

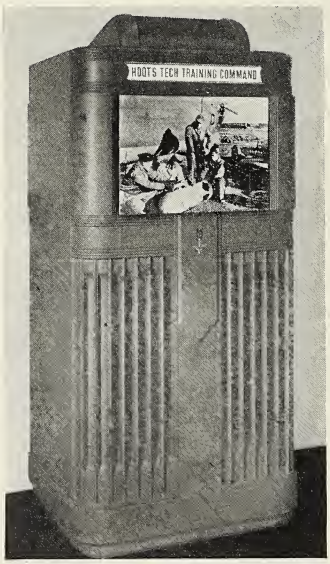
Since the unit was intended primarily for teaching maintenance of the sight, not operation, it is not connected to a turret. However, with a few modifications, it could be adapted for this purpose. It occupies a table top approximately 30 by 40 inches. ☆

Dead Reckoning Computer Mockup. The giant mockup is being adopted as an effective aid in teaching large groups of students the use of various instruments.

The photograph shows a giant mockup of the dead reckoning computer. The regular size is shown alongside.

Similar blowups have been developed on the aircraft navigation plotter, the air speed correction computer and the altitude correction computer.





Juke Box Goes to War. Remember the juke box you used to put a dime into for a three-minute short? You'll be seeing it again, but in GI paint and minus the dime slot. It's being used in AAF training establishments to show educational films. The projector operates with ordinary 16 mm film wound on an endless reel.

WHERE TO GO

Information on the availability of training films and film strips, aircraft recognition materials, synthetic training devices and training literature may be obtained from the Training Aids Division, Army Air Forces, Park Avenue and 32nd Street, New York, N. Y.

'COURAGE IS NOT ENOUGH'

By First Lieut. Peter J. Packer

FLIGHT CONTROL COMMAND

The following fiction story was written by Lieutenant Packer as the basis of a scenario for a safety education film to be produced by the AAF First Motion Picture Unit in collaboration with the Flight Control Command.—THE EDITOR.

TOMMY and I went through flight school together—pre-flight, primary, basic and advanced. We got along swell. Both of us were a long way from home, kind of homesick at first. But when a couple of fellows get to know each other real well, it makes things a hell of a lot easier.

I always thought Tommy was right up there with me when it came to getting passing grades until the time he flunked a fairly simple instrument quiz. Tommy just laughed it off, and I didn't pay much attention to it. I knew he had just received a letter from Joan, telling him that she'd marry him as soon as he graduated, so maybe that was the reason. Anyway, it wasn't important enough to be concerned about at the time.

In the air Tommy was a swell pilot. He took to the air like a duck takes to water, and his instructor had very little trouble with him. After six hours of flying time, Tommy could do more with his ship than most fellows can do after twenty. He was always raring to go when flight periods came around.

I admit quite freely that Tommy was a better pilot than I at that stage of the game, and from one standpoint he was a better pilot right up to the last. He was a natural when it came to aerobatics, and most of us in flying school were betting that Tommy was going to be the best fighter pilot in our class.

Well, you know there's a lot to flying you have to learn on the ground before you can take to the air. Some of it is dull, plodding material that just can't be made glamorous except to a congenital glamour boy.

Let me give you an example. It comes out of a tech manual:

"Scale error is defined as the algebraic difference of the standard pressure altitude and the indicated altitude when the altimeter is subjected to the pressure corresponding to the standard altitude (altitude chamber text)."

See what I mean?

Most of you know how to get the meat out of that piece. Anyway, I hope you do. Maybe you don't know it the way it's written in the book, but I'll bet when you are looking at your altimeters you know exactly what corrections to make for scale error.

If you cottoned to it the way I did, you tried to grasp as much as you could from the book, and when it got too much for you, you got your instructor to tell you about it in plain American—with gestures.

At any rate, I knew it was something

Tommy could have been a world-beater as a pilot but he elected to throw the book out the window.

I had to know. It didn't matter how I got it, so long as I knew it when I needed my altimeter.

Tommy slept through that lesson.

I remember that night in study hall when I said something to him about "pressure altitude variation," and he looked at me as if I were talking to him in Arabic.

Did Tommy pass his tests? Sure, he passed enough of them to get through. When a subject had him floored, he'd cram like hell just before the test and come to the classroom with a bellyful of half-digested facts which he'd shoot at the test paper like machine gun bullets. Ten minutes after the test, his mind would be a beautiful blank on the whole subject.

When I talked to him about it, he'd give me that world-beater smile of his, and tell me to quit worrying about him. All he was waiting for was the day when he'd be at the controls of a P-51 with his finger on the gun button, and a couple of Messerschmitts riding on the sights.

You know, when I think it over, it seems to me they just couldn't have washed Tommy out, even if he'd flunked every written examination in the school. He was too damned good in the air.

The way Tommy dove at a target and hit the bull was a cure for all the headaches in Washington. Tommy was a natural fighter. They just couldn't wash him out.

No matter how well you know a guy, no matter how much you're on his side, you just can't keep after him when it comes to studying. Either he gets all worked up about it and tells you to mind your own business, or else like Tommy, he says:

"Sure, I'm coasting through. I've got no time to waste on AT-6s, or that stuff you get in the classroom. A ship is like a car, see! You don't have to learn anything out of a book. You get behind the wheel and away you go. So instead of gear shifts, you've got elevators. Instead of brakes, you've got flaps. Instead of a steering column, you've got ailerons. Simple!"

So—we graduated.

As I said, Tommy always knew just enough at the right moment to get by. And the way thousands of us are going through the schools these days, there is never any one instructor who has time to concentrate on any one cadet.

There never is time, in wartime.

Tommy passed his tests, and that was the gauge the instructors had to his ability. The rest was up to him, as it was up to the rest of us.

The Air Corps used to be an outfit where every man was hand-picked, where every move he made was watched and studied and analyzed. He didn't have to be good. He had to be perfect.

But that was in peacetime, and many of the pilots who came out of the Air Corps in those days went to work for the commercial airways. I don't have to show you a graph of their record for you to know how good they were. American airline pilots are the best in the world.

So the Air Corps has to depend on the men themselves. It gives them everything it can in aircraft, equipment and knowledge. It gives them every last minute of time it can possibly spare to turn a pre-flight cadet into an airman with wings. And after that it gives them something that is like a letter of credit, a warrant of its belief in them. This letter of credit which each of us gets, is a sort of a green light to our Commanding General, which tells him that his Air Force is stronger by one more pilot, one more navigator or one more bombardier.

Don't look for that letter of credit in your 201 File. It isn't in writing. You

won't be able to walk into Wanamakers and order a camel-hair coat on the strength of it. But your squadron commander may be able to put out a field order that'll knock some Japs off the map on the strength of it.

All this isn't exactly about Tommy—but I guess it does have a bearing on the case.

Two days after we graduated Tommy and Joan were married. I was best man. They were married in a little place in Ohio where Joan's folks live.

A week later he and I were flying P-51s out of Patterson Field.

It was the same Tommy who had gone through cadet training—a whizz in the air and a stinker when it came to learning stuff that wasn't directly concerned with putting a cannon shell into the belly of a Dornier.

I remember one time we were flying formation. They made me the element leader and Tommy was my right wing man. We went up to 8,000 through the overcast and that was the last I saw of Tommy until I came down. He came in smiling about half an hour after I landed, with not enough fuel left for his cigarette lighter.

"What happened?" I asked.

"I stayed on the heading like you said," he told me.

"What heading?"

"One twenty."

"It was one forty, Tommy," I said. "For Pete's sake get hep to that navigation if you want to stay in the game."

Tommy smiled—world beater again.

"There I was," he said. "Just like I figured it would be in actual combat. And below me, maybe at 5,000 is a Heine bomber. He noses out through a break in the clouds, then he's hidden again, and I'm pretty sure he hasn't seen me. So what do I do. I make a 180 turn, climb a piece just to give myself lots of room. Then I make another 180 turn, and I dive, and believe it or not I am on his tail before you can say Schickelgruber. I let him have it. Bingo, the tail gunner is out. I let him have it again. Off comes the top turret. Then just before I climb out of his road, a lucky one gets him in the bomb bay, and it's all over."

"Did you actually do all that maneuvering Tommy?"

"Only in my head," he told me.

"And ended up 20 degrees off course. Nice going. You could have hit a mountain or something."

"Ain't nothing but hills in these parts," he grinned.

"How'd you get back?"

"Why, Steve, I know this country like the back of my hand. I let down to where I could see it."

What can you say to a guy like that?

Three months later we were in England. We flew with the Mosquitoes at first to get to know the country. Then they put us on missions of our own. We strafed railroads, airdromes, ammunition dumps—any damned thing we could find.

Tommy was a wizard. Enemy camouflage never fooled him. He could see stuff from the air like a chicken hawk.

One time when I thought he was lost—again—I had a wire from Brighton:

"HAVING WONDERFUL TIME. WISH YOU WERE HERE."

How he ever got to Brighton, which is on the south coast when our base is a hundred miles north of London, beats me.

"Had a little trouble with that Channel fog," he told me when I finally caught up with him. "Don't they ever have clear weather in this country?"

WHEN you're in combat you don't ride a guy the way you might back home. You have to use indirect methods to tell a man what you want him to know, like when I wanted Tommy to try and pick up a little more theory on instrument flying.

I took him along as my co-pilot on a night flight in a two-engine ship. I pretended to get lost and left it up to him to try and get us back. If I'd left it to him long enough, I think we'd have wound up in Iceland. Anyway, when he started figuring our position and making calculations, I almost wept. He was terrible.

I hoped the lesson would stick in his mind. Instead, he told me what a great flying partner I was, and he would never have to worry about getting in a jam so long as I was around.

"But supposing I'm not around," I said.

"Nothing's gonna happen to me, with Joan over there waiting for me to get back," he said. "Not a chance."

I don't pay much attention to luck, but Tommy had it if anyone did. He always got back—somehow. He was strictly a lone wolf when he did get back. He'd stay with the formation until we got to the target, but if we got in a fight he'd stay right in there until the fight was over, then lose himself. You could almost always bet your last dime that Tommy would never be at the assembly point when the others were. He either got home way ahead of us, or way afterwards.

So I began to believe in luck—until it happened. Then I knew it wasn't luck, but some complicated part of the law of averages which allows a guy to stay out of trouble for so long and then hits him when he least expects it.

It was a little place in Holland this time. I can't remember the name of it. Maybe I don't want to remember it because it'll always be tied up in my mind with Tommy Newton, with the law of averages, with the damned fool stubbornness of a guy who might be here today getting a medal pinned on his chest, and with a wife crying her heart out and having nothing to look forward to but the memory of the guy she loved.

You can't blame what happened on the weather, because we all came back. All except Tommy. He stayed in the North Sea. It wasn't good flying weather, but it was good enough to take a crack at the target and get back. It was a new flying field we'd heard about, and it was supposed to be crowded with those 16-year-old Nazi pilots. We wanted to throw a good scare into them before they knew what it was all about.

There was a fog, turbulence, ice—the works. And that's another thing Tommy never quite caught up with, weather. He could have learned about it and mastered it as well as the next guy, but he just didn't think it mattered too much. Weather wasn't a cannon in the spinner; weather wasn't .50 calibers in the wings. And because cumulo-nimbus didn't pack a wallop for the enemy, it wasn't important.

I knew what kind of flying we were headed for, so I took Tommy aside and made him promise he'd stay right beside me out and back. Tommy laughed and promised, and I like to feel that he kept his promise until it was just beyond his power to do so.

We got to the target, and we shot that place up from end to end. Altogether, we got nine Messerschmitts on the ground that trip, and headed for home—and believe it or not Tommy was right beside me. We came out over the North Sea about twenty miles north of The Hague. That was our assembly point and that was where we started to run into the storm area.

I got the signal from the leader for a 45-degree turn left with letdown to 2,000, and it was when I made that turn that I lost Tommy. I don't know exactly what happened, but I can guess that he balled up on the letdown, went off course and started flying contact, because contact was the most natural way for him to fly.

But the North Sea isn't like the country that Tommy knew like the back of his hand. Over the North Sea through an overcast, you fly instruments, damn it, or you don't fly! Tommy flew until he could fly no more. That's all I can say.

So we lost him.

I guess that's all there is to it. Tommy had everything that it takes to make a great flyer. He had guts, he was absolutely fearless, he was an ace in everything but respect for the laws by which a fighting ship fights not only its enemies who wear a swastika, but its enemies in the atmosphere. Tommy never learned that courage isn't enough. ☆

PICTURE CREDITS

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OCS—AUSTRALIA

(Continued from Page 24)

spent an afternoon, not speaking very much of navigation but of the last days of the Philippines and the epic flight of his big ship. Combat pilots, weather men, operations and intelligence officers, harassed depot officers, all gave us their time. We began to gain a broad perspective of the Southwest Pacific war theatre, and to comprehend the organization of the Army Air Forces. It began to add up to a single meaning that explained the early months on New Guinea and in the Northern Territory when the supplies were short and slow in coming, when the fighting equipment was against fantastic odds. The dry facts of administration began to explain the need for their existence, the need for tight organization. But it did become clearer than ever before that since it is true wars cannot be fought without paper, it is equally true that paper alone cannot win wars.

THE last weeks went swiftly. The class hurdled the final obstacles and held the affection of the second lieutenant of Infantry, who brooded over his platoon like a mother hen over her chicks, to the last. The daily drill and discipline did not ease up. It was a ninety-day course, the colonel had said, and if a man cannot take it for ninety days, the army suffers no loss. The threat of the final board hung over the camp like a pall, but it finally cleared away the Sunday before graduation—not without exacting a price. It is always hard to say good-bye to the men who have gone down.

Classification day was entirely and typically without ceremony. The AAF officers sat behind a small desk in an empty barracks, asked each man his experience and preference, wrote the recommendation and guaranteed all possible cooperation. The technical men, concerned over the possibility of administrative assignments, were assured that they had been pigeon-holed for their original departments since the first acceptance of their applications. The Panama infantry veteran stood outside, waiting his turn, biting his lips against the dreaded possibility of being chosen as an instructor. Five minutes after his name was called he walked out, stepping on clouds, inarticulate with relief. "Intelligence, boy, intelligence!" The two men chosen as instructors stood in the center of the sympathetic platoon, smiling wanly as they thought of their seven-day leave gone over the hill. The next class was to begin in five days.

We graduated at ten o'clock in the morning. At eleven, a group of the newly commissioned Infantry officers were rushed to the airport and loaded into a waiting transport that took them away on the first stage of their journey across the Hump, into the newly occupied territories of New Guinea. A small group of the Engineers looked at their orders, cursed feelingly, shook hands all the way round and reached for their baggage. They were going north the hard way—by train, then by boat to isolated, newly opened areas. And the Air Corps? The thirty of us were extremely grateful to Miami, for we had been given seven days leave—and only because a group of Miami men had arrived to fill the vacancies and relieve the pressure at last.

There was the matter of pay, of course, but we didn't mind the wait in the open area in front of the first company's orderly room. We needed time to become used to the feel of a commission. Then it was only another move to load onto the waiting trucks for the ride into town —but this time we weren't wearing the blue patch on our left shirt pocket. There was a gold bar on our collar, and a long planned dinner awaited us in that sanctum of sanctums where air-conditioning had been installed and there was, actually, ice in the well-prepared drinks.

New Guinea, with its oppressive heat, torrential rains, fetid swamps and crawling biting insects, was seven days away. That's a world of time, over here. ☆

What's Your AIR FORCE I.Q.?

LOWER your mental flaps and land on the AIR FORCE Quiz for this month. Score five for each question answered correctly. One hundred is perfect; ninety, a three-point landing; eighty, good; seventy, a little bumpy, and sixty, a close call. Watch out for cross-winds. Answers on Page 56.

1. **The horsepower developed by each engine of a B-24 is**
   a. 800 b. 2,000
   c. 1,400 d. 1,200
2. **The 11th Air Force Hq. is in**
   a. Australia b. Hawaii
   c. Alaska d. Panama
3. **Which word is inappropriate in this grouping?**
   a. Sextant b. Octant
   c. Pelorus d. Aerostat
4. **If you stall at 4,000 feet in a trainer, you should**
   a. Push the stick forward and increase engine power
   b. Shut off the engine and go into a glide
   c. Pull the stick back and increase engine power
   d. Lower flaps and go into glide.
5. **Rangoon is located**
   a. In Jap occupied Northern China
   b. In India
   c. Off the coast of Southern China
   d. In Burma
6. **The name given to the P-47 is**
   a. Marauder b. Maryland
   c. Thunderbolt d. Mustang
7. **In the first six months of 1943, the U. S. lost 846 planes in aerial combat. The enemy lost approximately**
   a. 1,000 b. 1,300
   c. 2,100 d. 3,100
8. **Assuming perfect visibility, the maximum distance the human eye can see from 10,000 feet is**
   a. 87 miles b. 123 miles
   c. 58 miles d. 43 miles
9. **The age limit for an Aviation Cadet is 18 to 26 inclusive**
   a. True b. False
10. **General Mitchell Field is located in**
    a. New York b. Texas
    c. Wisconsin d. California
11. **A lever labeled auto-mix is used on**
    a. A jeep
    b. PT-13 instrument panel
    c. Oxygen equipment
    d. Engine fuel adjuster
12. **The angle of incidence is an**
    a. Angle at which wings are attached to fuselage
    b. Instrument used by navigators in plotting course
    c. Angle at which stalling occurs
    d. Instrument used by bombardier in lining up target
13. **What is the distinction between true altitude and indicated altitude?**
14. **The RAF equivalent to the AAF rank of captain is**
    a. Flight lieutenant
    b. Pilot officer
    c. Wing commander
    d. Group captain
15. **The Technical Training Command and the Flying Training Command have been combined. The name of the new command is**
    a. AAF Training Command
    b. AAF Training and Technical Command
    c. AAF Flying and Technical Command
    d. AAF Technical Command
16. **The Medal of Honor is never awarded to enlisted men**
    a. True b. False
17. **Wewak is located in**
    a. New Guinea
    b. The Aleutians
    c. Burma
    d. Northern Australia
18. **Identify this collar insignia**

19. **The average rate of parachute descent per second at near-sea level is approximately**
    a. 35 feet b. 20 feet
    c. 10 feet d. 2 feet
20. **If an unexploded land mine is found in your camp area, it is best to**
    a. Notify the supply sergeant
    b. Remove the detonator carefully without moving the mine
    c. Put the mine in a bucket of water
    d. Notify the ordnance officer

FROSTBITE

FROSTBITE quickly loses its allusion to humor in high altitude flying where severe cold can make an exposed hand useless in a few seconds. The airman who, through excitement or carelessness, allows himself to get severely frostbitten while in the air subjects himself and his crew to danger and endangers the success of the mission as well. In the case of a gunner, it means the aircraft will be vulnerable in the area his gun protects.

Brig. Gen. David N. W. Grant, the Air Surgeon, reports that severe frostbite, particularly in the European theatre, is responsible for a large percentage of the hospital cases among airmen. Many of these cases have resulted in the loss of fingers, mutilated hands and permanent disability. Flight surgeons report from the field that the human element is usually a contributing factor in cases of frostbite. This means that most of them could be avoided. The problem of frostbite, therefore, like so many others in aerial warfare, depends largely upon the individual himself. The accompanying picture, showing the hand of a gunner in the 8th Air Force, reveals what can result from a few seconds of exposure in high altitudes.

FORTUNATELY, by following a few simple rules, an airman can protect himself from the serious consequences of frostbite.

In the first place, it is essential to wear the proper clothing and to wear it correctly. The clothing must be dry—even the most imperceptible moisture may lead to frostbite. Drying rooms, available at all fields, should be used. Wearing flying clothes before time for stations may cause perspiration to collect and lessen by thirty percent the efficiency of the clothing. Men with electrically heated suits should wear no more than the prescribed clothing underneath. This means one suit of winter underwear and one pair of woolen socks. There is no limit to what can be worn over the suits.

Men who have worn four pairs of woolen socks under their electrically heated boots, removed their hand protection for too long while unjamming a gun, or forgotten to test their suits before take off, have all regretted it. One waist gunner tried to change his oxygen mask at high altitude and took the easier way by removing his electrically heated gloves. In a few seconds his right hand was frozen so badly he was unable to use it again—and his formation was under attack by FW-190s. Other gunners have suffered severe frostbite because they forgot, after replacing their gloves, to plug them again into the suit's electric system.

It is also important that no clothing, including shoes and gloves, be tight fitting in high altitude flight. Such clothing restricts circulation and hastens frostbite.

Experience has shown that rubbing hands, feet and face with lanolin, olive oil or anti-freeze jelly will reduce somewhat the likelihood of frostbite because of their fat content. Flight surgeons recommend that crews on operational status rub one of these on the hands, face and feet every night for one week and then twice a week thereafter.

Despite all precautions, however, frostbite may occur. In such cases it is essential that the affected area be protected from further damage. Above all it should never be massaged and must be protected against further cold or excessive heat.

It is common sense that freezing can be of varying degrees, and should any persistent numbness or coldness of a finger, toe or portion of the face develop, it is of utmost importance that the individual report to his flight surgeon immediately. If this is impossible, the next best thing to do is warm the affected part very slowly and without rubbing. When treatment is neglected, even when the coldness and numbness does not seem severe, the results can be serious injury and permanent disability. ☆

The Wail of the Bombardier

By Lieut. Chester Turbak
24th Antisubmarine Squadron

I am now a Navigator;
I have drawn the big Mercator;
I'm a cross feed operator—
Yes I am!

Why, I plot our new position
Under any old condition,
And work hard on every mission—
Uncle Sam!

Now to be the big sensation
Of our little aggregation,
Take up "DR" navigation—
IT's the thing!

They can't get along without you;
There's that certain thing about you;
In a pinch they dare not doubt you —
You're the King!

Now the Pilot does the flying
While the Bombardier is spying
And the Navigator's crying,
"Where are we?"

Then he whips out his Weem's plotter
And he flips his lucky quarter,
Then looks down and sees the water—
"We're at sea!"

You can't be a fussy chooser;
If you are, you are the loser;
Use the E-6B confuser
When in doubt.

It tells you where you're goin'
Even if the weather's snowin';
If it's wrong then start a-rowin'
If you're stout.

When our plane begins a-roamin'
And the pilot is a-foamin',
Then we just start in a-homin'—
Right away!

So we tune in on the station
Till we reach our destination,
Where we get the big inflation—
Hip Hurray!

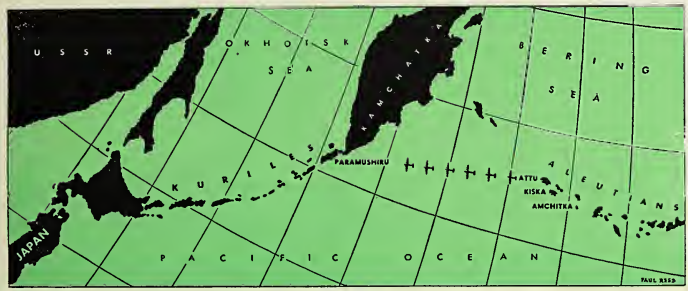
And now friends, in conclusion,
You must pardon this intrusion;
There is really no confusion
In our ranks.

With the proper inspiration
You can make your navigation
The just pride of our great nation—
WE, THE YANKS!

Bombs for Paramushiru

(Continued from Page 19)

appeared to be as much of a surprise to the Japs as the first, perhaps because our approach was hidden by the overcast until we came within a short distance of the targets. They seemed to be on the alert this time, however, because planes were seen to take off the ground while we were still on our run and it wasn't long until the air was full of Zekes, Rufes, Haps and Oscars. During the running fight that continued for



about 45 minutes, there were observed several other types including one Watanabe Zero, a float reconnaissance plane and one plane with fixed landing gear, painted silver with a black stripe on either side of the fuselage.

In the waters of the strait we could see a large concentration of ships.

It was a beautiful sight, the fluffy white overcast stretching away in all directions except for the big blue hole over the target and the rugged mountains on the southern part of Paramushiru sticking up through the clouds. But the scenic effect was only momentary. It was suddenly broken by the Jap planes swarming up through the overcast like bees out of a hive.

The runway extends north-south on a low plateau north of the army staging area. The Zekes were parked on a string of little T-shaped hard surface platforms beside it. As we came over they took off, apparently as each plane got ready and without any regard for formation. They taxied straight ahead across the runway, taking off from a large area to the east which extended almost to the waters of the Bay. The whole field—runway, parking platforms and all—must have been as level as a billiard table because they seemed able to get off in any direction.

The anti-aircraft crews were on the job this time, and puffs of smoke started blotching up the sky before we were actually over the targets. It was black, apparently of large caliber, and pretty hot toward the last. Fortunately, it was accurate only for altitude and not for course. It appeared to be of the barrage type, aimed for a certain altitude over the target. As at Kiska, the most accurate fire seemed to come from ships in the harbor, rather than the shore batteries.

"A" flight got away its load including the incendiary clusters from 11,500 feet, one string hitting a group of large buildings in the naval base area on Shimushu and a second about a hundred yards to the left in another building area. The third disappeared into a low cloud so that the result could not be observed. The interphone sounded as though some kind of a convention was going on as explosions and fires from the incendiaries were observed by various members of the crew.

After all the bombs were away, "A" flight made a diving turn to the left, leveled off at about 5,000 feet and followed the southern coast of Shimushu to Nakagawa Bay whence it headed out over the sea toward home.

"B" flight proceeded over the Kashawabara staging area dropping its eggs from between 10,000 and 11,000 feet. All struck in the target area along the shore, where explosions and fires were seen. One pier was demolished and a vessel beside an adjoining pier overturned. After completing its run, the flight continued around the south post of Shimushu to join "A" flight for the return trip.

Just before "C" flight reached its target, the shipping in the strait, Captain Wadlington noticed that some of the larger vessels were hidden by low overcast and made a sharp turn to the south, planning to come back over the army staging area for his run.

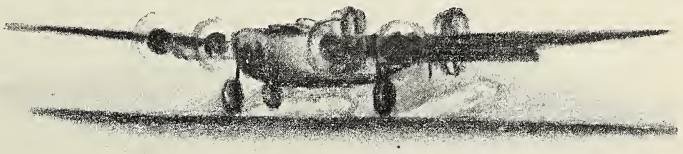
All three planes executed the right turn but when the flight made a second turn of 180 degrees to follow the northerly course, Captain Hoffman, apparently misunderstanding the maneuver or, perhaps, having some difficulty with his plane, continued to the east. His plane was last seen flying southeast at about 12,500 feet, pursued by two Zekes which, however, were still out of range. His plane did not return to the home airport and it is not known whether he was forced down on some other landing place.

The other two ships of the "C" flight dropped everything they had on the staging area from 12,000 feet. The bombs struck a large warehouse and some adjoining buildings which were seen enveloped in smoke and flame. After the run both ships dove to about 1,000 feet to take advantage of the cloud cover as they followed an easterly course across the northern part of Shimushu.

While the anti-aircraft fire did not bother us a great deal, despite its intensity, the Jap planes did. There were about forty in all, mostly Zekes, armed with two or three machine guns and some with cannon. Six Mavis four-engine flying boats were on the water in the harbor and about 25 or 30 other planes could be seen on Bettobu Lake east of the naval base, but none of these took off.

The attacks lacked coordination and were not always pressed determinedly but they kept after us until we were well on our way home, a few of them for forty or forty-five minutes.

They attacked alone or in pairs and some, probably the green pilots, veered



away before coming in range, even when they had numerical superiority. Their favorite angles seemed to be 5 and 7 o'clock from which they could use the two vertical stabilizers as a shield to protect them from the top turret and tail gunners. However, several times attacks were made from the front at about 11 o'clock, perhaps for variety. Most attacks were made from our level although occasionally one dived and came up from below.

Most of our gunners had come up from the States as replacements only a few months before and had never had an opportunity to fire at a Jap plane until that day. Nevertheless, they worked like veterans, warning each other over the interphone as the enemy was getting out of range of one gun and within range of the next man's. They were cool as cucumbers throughout the whole attack, although there was hardly a plane in the fight that didn't have three or four Japs buzzing around as we started the return trip.

We got five planes that were confirmed and six probables which we are certain would have been confirmed had it not been for the overcast. We could see the probables diving into the clouds but since we couldn't see them hit the water no confirmation was possible. Six more were damaged.

Mistakes in 'On The Line' Picture on Page 44

(Reading from left to right)

1. To remove the tire from the hub with a pair of screw drivers is practically a job for Superman. Friend, use a tire iron which is blunt on the end and won't cut into the rubber. Reference: TO 04-5-10.

2. Oh no, not that, please! The ladder leaning against the leading edge of the stabilizer will harm the skin fabric.

3. Bad business to insert that twelve-inch crescent wrench between the leading edge of the elevator and the trailing edge of the stabilizer to hold the elevator in horizontal position. A pair of hands is the required "tool" to hold the elevator in place.

4. You, standing there in front of the jack, it's dead wrong to take dents out of a trim tab with a pair of pliers. Dents are removed by pressing the trim tab between two wooden blocks. Reference: TO 23-15-1.

5. Caught in the act, pal! You ought to know better than to stand on the stabilizer. It isn't constructed to withstand a man's weight. Besides those GI shoes are plenty tough on the airplane's skin.

6. The same guy up there has the wrong version of "safety in numbers," namely, the number of boners he's committing are in opposition to safety! To remove a bolt from the rudder hinge, hammer and screw driver are the *wrong* tools; they will ruin the bolt, and should the screw driver slip it will damage the rudder skin. A punch or drift is to be used here. Reference: TO 01-65BC-2. And by the way, that long screw driver in his breast pocket can jab him or someone else in the ear.

Two of the positives were credited to Lieutenant Lockwood's plane. Two Zekes, coming up from below, attacked simultaneously, one at 11 o'clock and the other at 5. Lieut. Merle E. Arthur, navigator, gave the one coming in at 11 a burst at about 500 yards. The Zeke broke off and trailed smoke as it went into a dive and exploded after diving about 2,000 feet. Staff Sgt. Walter Succov, tail gunner, and Sgt. David L. Carter, belly gunner, got the other one from about 900 yards. The Zeke pulled up into a stall and fell off on the right wing with flames coming from the engine. It dropped into the ocean. A Hap followed this one down, circled the wreckage and climbed up to follow the plane again, but staying at a pretty safe distance.

Lieutenant Lockwood's plane, still plugging along on three engines, was damaged considerably in these and other attacks and began to lose altitude. The crew had a field day throwing things overboard to lighten the plane, and the ship was pretty well stripped in short order. It descended through the overcast and was flying at only about 200 feet when the crew got one of those thrills that brings your heart right up into your mouth. All three motors quit together due to a vapor lock. With exceptional presence of mind, Lieutenant Lockwood quickly threw on his booster pump and turbos and held his breath. Sergeant Carter in the belly turret was only fifteen or twenty feet above the white caps when all three motors started again. The plane gathered headway and climbed to a safe altitude.

While all the ships got plenty of attention from the Japs, Lieutenant Smith's plane, the last one over the target, probably got more than the rest. He became separated from Captain Wadlington in the cloud cover at about 1,000 feet, and had a running fight with ten Japs who followed him across the northern part of Shimushu Island and more than a hundred miles out to sea. At one time there were three Japs on each wing and four on the tail. Three were shot down positively and one probably, while two others were damaged in this melee.

Staff Sgt. Ira Edwards, waist gunner, got one of the positives—a Rufe that peeled off, did a vertical roll and came down from above. Edwards got in several bursts, and the Rufe did a wingover and burst into pieces almost in front of Smith's plane.

Staff Sgt. A. Dumas, tail gunner, knocked a piece off the left wing of a Zeke coming in from 7 o'clock. It went out of control at about 1,500 feet and dove straight down into the water.

Staff Sgt. William C. Nichaus, waist gunner, accounted for the two-float Watanabe Zero, with tracer fire seen to enter the cockpit. The plane fell off into a spin from 1,500 feet.

More than twenty passes were made at Smith's plane during this running attack but the crew, in a fine display of teamwork, kept the Japs so far away that only a few small caliber bullet holes were noted in the fuselage when the ship was checked after the trip.

On the way back two Japs were seen from Lieutenant Lockwood's plane descending by parachute about thirty miles east of Shimushu and two planes were seen not far away burning on the water. However, there was no way to tell how the planes had been brought down or whether the two pilots had bailed out of the two planes on the water, since they were beneath the overcast and none of the action had been seen.

Later, Lieutenant Pottenger radioed that he had lost No. 4 engine and was unable to feather the prop. He also reported one supercharger was on fire. "A" flight throttled down in order to enable him to keep in formation but his plane continued to drop behind. He was last seen about 3,000 yards to the left as the flight went into a cloud formation at about 5,000 feet.

The other seven ships returned to Attu, Lieutenant Lockwood's plane only a few minutes late despite its damaged condition. The Paramushiru mission was officially over but we were not quite through with the Japs. Returning to our home base the following day, we flew over Kiska and made what proved to be our final bombing attack on that target. ☆

Answers to Quiz on Page 53

1. (d) 1,200 horsepower.
2. (c) Alaska.
3. (d) Aerostat.
4. (a) Push the stick forward and increase engine power.
5. (d) In Burma.
6. (c) Thunderbolt.
7. (d) 3,100.
8. (b) 123 miles.
9. (a) True.
10. (c) Wisconsin.
11. (c) Oxygen equipment.
12. (a) Angle at which wings are attached to fuselage.
13. The altimeter reading gives you indicated altitude. True altitude is obtained from the indicated altitude by correction for atmospheric conditions and instrument errors.
14. (a) Flight lieutenant.
15. (a) AAF Training Command.
16. (b) False.
17. (a) New Guinea.
18. Military police.
19. (b) 20 feet.
20. (d) Notify the ordnance officer.

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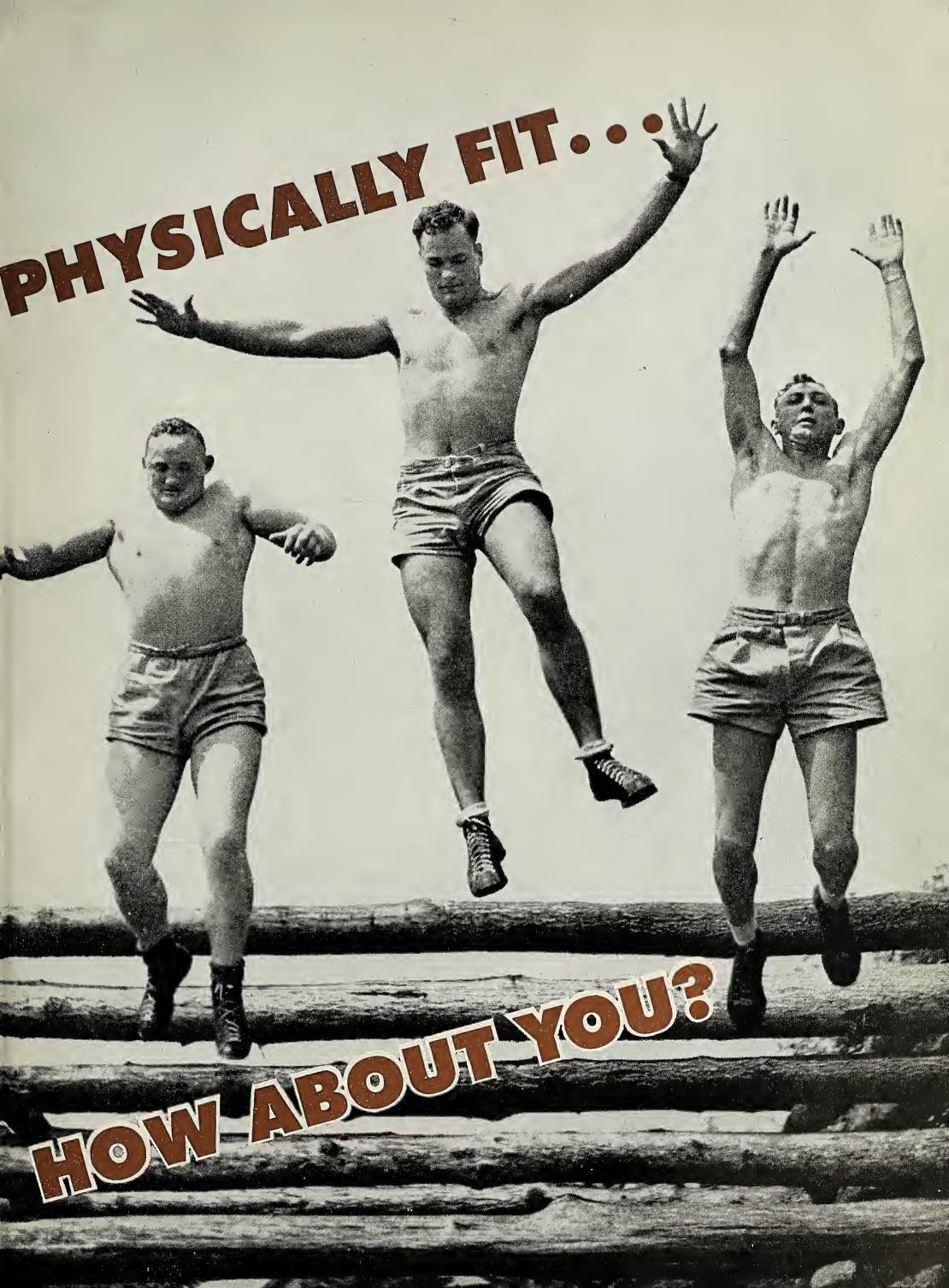
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Win Your Wings

AND COME ALONG!

Enlisted men between the ages of eighteen and twenty-six inclusive, whose organizations have not been alerted for foreign duty, are eligible to apply for aviation cadet training to become bombardiers, navigators or pilots. Application blanks, AGO Form 60, can be obtained from commanding officers, the nearest Aviation Cadet Examining Board, U.S.O. clubs or recruiting offices.

Army regulations (AR 615-160) provide for transportation, at government expense, of enlisted applicants for air crew training to the nearest Aviation Cadet Examining Board to determine qualifications, if one is not located on your post.

Your seventeen-year-old friends may also apply for this training by qualifying for enlistment in the Air Corps Enlisted Reserve.

If you previously applied for air crew training and were rejected for physical reasons, you may try to qualify now under the relaxed physical standards recently announced.

● You can apply now for

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AIR CREW TRAINING

AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

DECEMBER 1943

Vol. 26 No. 12

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AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

December Brief

WHAT WILL HAPPEN to you when you are ordered back to the States from a theatre of operations? If you are not physically fit for further combat, will there be a non-combat assignment for you? Will you have the opportunity to see your family? How will you be reassigned?

The answers to these and many other similar questions are to be found in the article on Page 5 which describes the establishment of a redistribution program by the Army Air Forces. The program is a result of months of study by Headquarters personnel officers. The detailed flow chart which accompanies the article portrays each step in the reassignment process, from the time an officer or enlisted man is ordered to return from his overseas station until reassigned in this country.

ONE OF THE greatest aerial battles in history was fought during the mass bombing raid on Regensburg August 17. A vivid account of the mission appears on Page 9 in the form of an official report written by Lieut. Col. Beirne Lay, Jr., a co-pilot on the raid. Colonel Lay, who served at AAF Headquarters prior to his assignment with the 8th Air Force, is the author of the book, "I Wanted Wings," based on his experiences as an aviation cadet. Colonel Lay has returned to the States for transition training in B-24s.

THE GRAPHIC STORY of the old Henderson Field control tower and its operators, which appears on Page 37, was prepared on Guadalcanal in answer to a request by higher authority in the Army Airways Communications System for a history of tower operations at the base. "Henderson Tower" is no dry history; it is a vivid, fast-moving sample of life in the tower during those hectic early days. Co-authors of the article are Capt. J. E. Roberts, a security officer and former newspaperman, and Staff Sgt. John R. Dunn, a former advertising copywriter, who has since returned to the States to enter Officer Candidate School.

THE DISPLAY of ingenuity on the part of ground crews, both at home and overseas, has been one of the most important factors in the present air war. In their ability to make something out of nothing when a situation demands it, our ground personnel —officers and men—have been without parallel. AIR FORCE this month begins a new feature on these men, based on maintenance reports received from combat theatres by the Air Service Command. Read "On the Combat Line," Page 26.

The Front Cover

There is no greater bond in this war than that between a fighter pilot and his crew chief. The pilot has the wings, but his crew chief sweats out every minute his plane is in the air, seems to care more than the pilot himself whether his plane and his pilot come home intact. This month's cover picture, taken by Tech. Sgt. Roger Coster, staff photographer, portrays this spirit. It is a scene that is re-enacted thousands of times a day around the world, wherever the men of the Army Air Forces are fighting.

THE AIR FORCE Roll of Honor feature has been redesigned this month to permit the inclusion of more names and to afford easier readability and identification. The number of AAF officers and men receiving decorations has increased considerably during the past few months, resulting in the accumulation of a backlog of names. Until this surplus is exhausted, AIR FORCE will devote additional space to the feature. Three pages of names appear in this issue, beginning on Page 34.

A NEED for a better understanding of the proper use of the navigator's astro-dome is expressed in the article on Page 12 by Col. Thomas L. Thurlow, chief of the instrument and navigation unit of the Materiel Command equipment laboratory. Colonel Thurlow tells how the dome can be employed to best advantage by navigators.

FROM THE STANDPOINT of the armorer, we are designing guns and putting wings on them. A progress report on our developments in firepower by Col. Frank C. Wolfe, chief of the armament laboratory at Wright Field, appears on Page 14.

AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

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CROSS COUNTRY

IMPORTANT revisions are being made in the Army Air Forces training program with the following principal objectives:

(1) To coordinate training activities.
(2) To provide standardization and continuity of instruction.
(3) To bridge existing gaps.
(4) To insure maximum use of equipment and manpower.
(5) To correct shortcomings indicated by operational experience.

On September 20 at Colorado Springs, 260 officers engaged in various phases of AAF training met to re-examine the program, convening by committees for studies of specific problems. Brig. Gen. Robert W. Harper, Assistant Chief of Air Staff, Training, returned to Washington with a stack of committee reports and recommendations.

In cooperation with the Training Command, the training air forces, and other agencies involved, moves are under way to effect many of the Colorado Springs proposals.

Most important of the changes are those affecting flexible gunnery instruction. Revisions in gunnery training are being made in all the air forces and commands. Flexible gunnery instruction is being started in the 1st and 4th Air Forces, which now are undertaking bombardment training as well as fighter training.

To make sure that flexible gunnery training progresses smoothly from one phase and one agency to another, schedules and curricula of the Training Command and the training air forces will be closely coordinated. By more effective liaison, the training schedule of the air forces will be made to pick up exactly at the point where that of the Training Command leaves off. By continued instruction and practice in the air forces, a maximum of gunnery training will be provided. Gunnery instruction has been handicapped in the past by lack of towing airplanes.

Further to standardize gunnery teaching, a manual is being prepared for use in all schools. It will become the bible of gunnery instructors. The Central Flexible Gunnery Instructors School will furnish gunnery instructors to the training air forces as well as to the Training Command.

As rapidly as practicable gunnery officers will be provided for squadrons, groups and wings to supervise training, to assist gunners and to see that equipment is kept in good condition.

A significant development in gunnery training is the use of the AT-23 airplane, a B-26 stripped down for target towing. Because of its exceptional maneuverability, it is admirably suited to this purpose. Tests have shown that at 22,000 feet the AT-23 can make 25 runs on a B-17 in 45 minutes. The calibrated airspeed of the AT-23 while towing targets at this altitude is 190 to 200 miles per hour.

Revisions also are in progress in the training of navigators and bombardiers.

The bombardier course is being increased from twelve weeks to eighteen weeks to allow a six-week instruction period in dead reckoning navigation. By May, 1944, every man who graduates as a bombardier will be proficient in dead reckoning navigation. This should not be confused with the existing 27-week course for students who graduate as precision bombardier-navigators.

As further evidence of current emphasis on broader training, an effort is being made to process all group commanders—present and future—through a modified course of navigation, bombardment and gunnery training. This will be done as the manpower and tactical situations permit. As an experiment, a two-weeks' course for group commanders has been conducted at El Paso, Texas.

Increased realism is being sought in tactical training. Combined fighter-bomber training in each of the domestic air forces is the principal step to be taken towards that objective. Having both fighters and bombers available will permit practice operations under conditions closely simulating those found in actual combat. Heretofore for training purposes, the 1st and 4th Air Forces have had fighter units only, the 2nd has had heavy bombardment only, and the 3rd has had medium and light bombardment and fighter units. Heavy bombardment training is being added in the 3rd Air Force.

To give greater effectiveness to these combined operations, it is planned to increase the minimum flying-time requirements for fighter RTU pilots, now sixty hours.

As another form of combined operation training, the 3rd Air Force has two groups working with units of the Army Ground Forces on tactical maneuvers.

As soon as practicable, all instrument instructors will be graduates of the AAF Instructors School (Instrument Pilot), Bryan, Texas. A set of minimum qualifications for instructors has been established as a temporary measure until AAFIS graduates can be used exclusively.

Since September 1, the Training Command has been able to furnish to the training air forces qualified four-engine airplane commanders in sufficient numbers so that transition training in the air forces is unnecessary. This will mean that additional time will be allowed to turn out better OTU groups and RTU replacements.

SMART OPERATOR

Tech. Sgt. Herman Sachnoff is the type of individual who thinks you can believe about half of what you hear. On the way to a bombing target in the Mediterranean theatre, this B-25 radio operator received a message—in the proper code of the day—to change course and attack a different objective.

The message seemed proper enough, being correctly coded, but Sachnoff became suspicious. At that particular spot over Africa he had never been able to get strong signals from his base, and this message came in surprisingly clear. By using his radio compass the sergeant was able to determine that this message was coming from a direction ahead of his position, although his base was located

in the rear. Realizing now that it was an enemy message, he radioed back to his base, warning them of the fake. The B-25s proceeded to the original target.

On the way home, the sergeant's flight passed about 150 Allied fighters heading at 30,000 feet toward the false target. When these fighters reached the area to which the attempt had been made to lure the B-25s, they found 45 Messerschmitts circling at 20,000 feet, waiting to ambush the B-25s. The Allies dove on the MEs and destroyed thirty of them. Sergeant Sachnoff received the Distinguished Flying Cross—for being the type of guy who doesn't believe everything he hears.

Gentlemen Be Seated

Although maintaining planes in fighting trim is their big job in combat, ASC personnel in theatres of operations frequently are called upon to perform tasks which are but remotely related to keeping 'em flying. From the 9th Air Service Command in the Middle East comes the report that a squadron CO, Capt. E. P. Kapal, was more than a little annoyed when his trained aircraft woodworkers were given the job of turning out a batch of toilet seats for the boys. However, the craftsmen laid to with a will and produced more than 1,000 seats in two weeks. These were considered ample for the moment.

Family Spirit

You can add up the achievements of the Army Air Forces in many ways, but sooner or later you become aware that our victories are won as much by the spirit of our men as by the excellence of our equipment and the superiority of our methods.

That spirit builds up into what we know as a "family feeling," a relationship among personnel that characterized the Air Corps when it was so small the Commanding General knew virtually every officer and enlisted man by name. Somehow, over the years, it has been maintained, even in an organization that exceeds two million men.

The family spirit manifests itself in the desire of Air Forces personnel to "look after their own," and often reaches outside the service to encompass the relatives and friends of men who go down in line of duty. One such example is this letter to the Commanding General from a father who lost his pilot son in action. The letter reads:

Dear General Arnold:

This letter is the quite unexpected and unanticipated sequel to letters I wrote to you and General Marshall early last May. Added to what I wrote then, it completes the story of what *must* be the *perfect* example of what you wish every unit in your Air Forces could do for every flyer killed in action, and his family.

When I wrote you in May, I believed that it would be impossible for any squadron to do more, or more promptly, than the men of the ——— Squadron did for our late son, Captain ——— and his folks.

But I was wrong, for in July Major ———, Squadron Intelligence Officer, took time from his short leave with *his* family to visit us. With him he brought intimate stories of Jack and the squadron, a picture of Jack snapped the morning of his last flight and a priceless memento of their long trip across the desert...

Then, about three weeks ago, our son's close friend who was with him on that last flight spent a day with us. He filled in a lot of the background. We heard his stories, saw his souvenirs, read his diary, saw his pictures, and everything proved to us that our son had been well, happy and lucky until that last second.

But the grand climax, which I don't think any human being or organization could plan or produce, came about ten days ago at ——— Field. The occasion was the formal military presentation of three posthumous awards to Jack, with his mother, his little sister and myself present to accept them.

The arrangements had been made most thoughtfully and considerately through correspondence with the Special Awards Office, AAF, Washington.

The day was perfect and we looked forward to meeting at least one member of the ——— squadron at the ceremonies.

Now, the miracle! Can you imagine the thrill, the joy and the prideful consolation we experienced when our escort, Lieutenant ———, took us into the Base Officers Club, there to find *seven* men from Jack's squadron who had trickled in from north, south, east and west by noon that day—together, themselves, for the first time since they had started coming home five and six months ago!

"Furthermore, we don't announce approaching Jap planes by saying 'Ceiling Zero'!"
—J. T. RAWLS & SGT. P. J. KAATZ.

I'll never know how it happened or who was responsible. Maybe you and God. But how they all heard about it, how that date fitted into their seven different schedules of duties, transfers, leaves, etc., so that they could all turn up that Friday afternoon for their buddy's "last commencement"—well, that's something I've quit trying to figure out; for in that group of four majors and three captains were all Jack's squadron officers—the men who'd written us those marvelous letters, sent us the photographs taken where and when they found our son's grave—tentmates and classmates from cadet days, men we *felt* we knew and had known well for the past year and a half. Of course, we had dreamed of meeting all of them somehow, someday, but always admitted that it was only dreaming. Such things don't happen, for the world keeps moving—and *fast*—in wartime. Yesterday's dead heroes and yesterday's "decisive" victories soon become old stories, akin to Civil War heroes and Gettysburg, for new battles and new buddies, fortunately, soon take the place of the old for soldiers.

Knowing this, we consider ourselves blessed above any other parents of whom we have ever heard. Like many thousands we have lost a son in action, but unlike most others we have had the rare consolation of the unbelievable chain and combination of circumstances listed in this and previous letters.

I feel sure that if it were in your power to do it, you would wish every family to receive the same breaks that have been ours, when death takes a flying son under your command. But you can't put such a perfect "military operation" in the rule books.

To top off the marvelous demonstration of "esprit de corps" in your Air Forces, we learned *that* Friday night that taking part in the military review that day were some fifteen Air Forces enlisted men who had known our Jack seven to fifteen years ago, back in grade school. When they heard of the award ceremonies, they voluntarily cancelled their weekend leaves and begged to be allowed to march with the selected squadron. And they did. We don't know who they were, even.

But that ought to make you feel almost as happy as it did us, an evidence of the extent and character of the high morale you've worked so long and hard to inspire in the Air Forces.

Because I feel that you have set the tone and standards for the Air Forces which developed in our case, into this incomparable story, I have written to thank you.

Sincerely,

The Glider Training Program

The Training Command again is accepting applications from AAF enlisted personnel for glider pilot training.

Enrollments were cut sharply a few months ago. A number of men were dropped from the course and assigned to domestic air forces. Increased current requirements, however, have caused the Training Command to reopen the enrollment on a limited scale.

Glider pilot training is available only to volunteers between 18 and 37 who have completed basic military training. They must have evidence of having flown at least 125 hours as an aircraft or glider pilot, including a minimum of 25 hours within the past year.

Applications should be submitted through channels to Headquarters, AAF Training Command, Fort Worth 2, Texas.

Final Warning

A list of names, recently posted on the bulletin board of a squadron at Harlingen (Tex.) Air Field, was accompanied by these terse instructions: "The following enlisted men will pick up their Good Conduct Medals at the supply room this afternoon. Failure to comply with this order will result in disciplinary action!"

Candy and Kids

Staff Sgt. Ronald R. O'Neil, 43-year-old combat cameraman in England, wanted to celebrate the seventh birthday of his little boy back in the States. Since he couldn't be with his own son he decided to entertain seven boys, all seven years old, on his son's birthday. In preparation for the celebration, O'Neil began

saving his candy and gum rations. When the boys in the mess hall heard of the plan they gave the project a hefty boost by volunteering to bake a huge birthday cake with all the trimmings for the party. Meanwhile O'Neil's buddies in the combat camera crew tossed their candy and gum rations into the pool. By then there was enough for sixty kids. When the party was held the guests of honor were seven boys, seven years old—but 53 other children from an English orphanage were also invited. Sergeant O'Neil served a hitch in the other war and has another son with the AAF in Sicily.

Draw One

A bomber group at an advanced base in northeastern India had not received its regular ration of beer. To expedite the matter they sent a B-25 down to Calcutta to pick it up. The pilot whizzed down and took aboard 3,000 pounds of canned beer. When he got back the pilot gave the field an excellent buzzing. When he pulled up, however, the bomb bay doors opened and the installation was given a terrific beer bombardment. One officer, sitting in his quarters, vows that a case came flying through an open door, slid across the floor and out an exit at the other end. We have learned from witnesses that most of the beer was salvageable.

Parachutes—Lost and Found

Lost:

Numbers 42-31759, 42-3757, 42-37259, 42-37325, 42-37345, 41-6358, 40-1151, 40-2174, 40-1354, 40-1262, 40-1251. Return to Office of the Engineering Officer, Base Engineering, APO 839, care of Postmaster, New Orleans, La.

Numbers 41-10499 and 40-516. Return to Office of the Engineering Officer, 73rd Sub-Depot, AAF Bombardier School, Midland, Texas.

Numbers 42-281807, 42-442071, 42-331000, 42-324870, 42-442928; return to Property Adjustment Board, Municipal Airport, Nashville, Tenn.

Number 42-92320, detachable type; return to Operations Office, Headquarters Midwestern Procurement District, Municipal Airport, Wichita, Kansas.

Numbers 39-153, 42-289607, 42-389261. Return to Headquarters and Headquarters Squadron, 1st Tactical Air Division, Morris Field, Charlotte, N. C.

Number 42-292819, (Type S-1); return to Office of Operations Officer, 57th Fighter Squadron, Bartow Army Air Field, Bartow, Fla.

Number 41-41586 (Type B-7); return to 57th Bombardier Training Squadron, Kirtland Field, Albuquerque, N. M.

Number 41-9061 (Type S-1), No. 42-144998 (Seat type); return to Base Operations Officer, Kindley Field, Bermuda.

Found:

Number 42-668816 is held by Headquarters, Air Cargo Depot Detachment, Air Service Command, 179 E. 8th St., St. Paul, Minn.

Number 41-15817 (Type S-1) is held at Office of the Supply Officer, Headquarters 71st Sub-Depot, Key Field, Meridian, Miss.

Numbers 42-409548 and 42-652279 (Type S-1) held by Base Operations Office, Army Air Base, Lincoln 1, Nebr.

'Air Corps Airs'

As a follow-up to our mention of "Air Corps Airs" last month, we report that it covers songs airmen have sung since 1921. The new song book naturally includes the official song of the AAF and from there takes off in every direction from "Wings on High" to "The Ground Crew," not forgetting that well-mated pair "He Wears a Pair of Silver Wings" and "Round Her Leg She Wore a Purple Garter." The flight runs from stout-hearted "Sons of Randolph" right down the line to "Beside the Brewery at St. Mihiel."

The book is bound in blue, water-repellent stock with the Air Corps insignia prominently displayed in gold. The songs are divided into five sections classified as Popular Songs, 1922-1943; Hymns, A West Point Interlude, Light-Hearted Songs of Death and Destruction, and Post War. This book was made possible from an editorial standpoint largely through the efforts of Mrs. Barton K. Yount, wife of the commanding general of the AAFTC, and Harry Fox, president of the Music Publishers Protective Association, who handled the considerable chore of dealing with copyright owners. Thirty-two publishers gave releases for songs in the book.

Better to Give. . . .

Sixty-five American soldiers responded recently when the British Red Cross asked for volunteer blood donors at an ASC supply depot of the 8th Air Force. It all started when the British Red Cross asked Capt. Al Ryan, group surgeon, to aid in obtaining plasma. So great was the response of Americans that the appeal had to be suspended after all the bottles had been used. The men have asked for another chance to help their Allies, however, and a second blood bank will be conducted.

Pin-up Boy

The picture of a commanding general appearing on the office walls of his staff is not at all unusual, but it is news when a commanding general asks for the photograph of a flyer to hang on his own wall. Lieut. Gen. George C. Kenney, commanding the 5th Air Force, made such a request when he learned that Capt. George P. Dunmore, a bombardier, had sunk six Jap ships for a total of 20,500 tons—a record that other bombardiers in the area have yet to equal.

Post War Planning

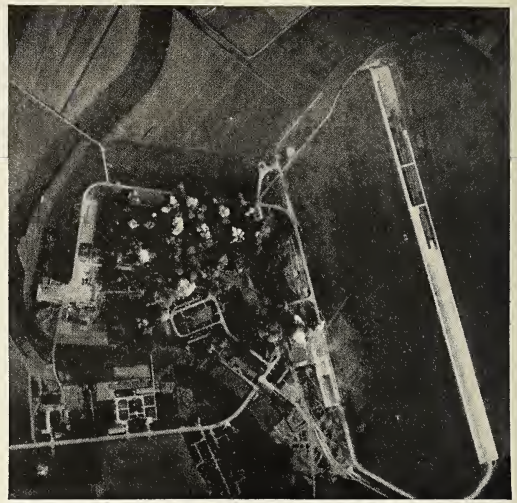
One of our scouts has just returned from an airbase in the midwest where he met a comely WAC lieutenant stationed at the base engineer's office. In the course of conversation, it developed that this girl was a Chicago debutante before joining Colonel Hobby's ranks, with a flair for night life, low-cut evening gowns, orchids and champagne. All in all, it was a sudden change-over to her trim, tailored, olive drab service clothes. However, the girl seems to have found some compromise. Each payday she goes downtown and buys herself the sleekest, laciest night gown she can find. She never wears them. Just folds them away in her footlocker.

"Everytime I get depressed I open my locker and look at them," she explained to our scout, who retired in disorder.

—The Editor.

"Was that Focke-Wulf at eleven o'clock *'standard'* or *'war'* time?"
—Fritz Wilkinson

1—On October 9, in their deepest penetration into Germany to date, B-24s and B-17s of the Eighth Air Force attacked as one of their targets the Focke-Wulf 190 factory at Mariensburg in Eastern Prussia



2—General Arnold has termed this attack the finest examples of daylight precision bombing. In the photo above, the first bombs blast the factary, ane af the Nazis' largest plants far fighter aircraft assembly.

Knockout Punch

3—Bomb bursts and fire billow up into an enormous mushroom of smoke and debris over the vital target as showers of missiles find their mark.

4—Reconnaissance photo after the attack shows the assembly shops, hangars and other structures entirely devastated by the accurate bombing.

RETURN FROM COMBAT

How the Army Air Forces are pioneering in a program for handling personnel coming back from the war zones.

THE Army Air Forces have set up a redistribution program to insure the proper handling of all personnel—officers and enlisted men—returning from overseas theatres of operations.

Without precedent in the armed forces of the United States, the overall plan provides as its major objectives:

(1) That men returning to the States for change in duty assignment are properly conditioned mentally and physically to assume new duties.

(2) That the right men are placed in the right jobs.

(3) That battle casualties are afforded the best possible treatment.

(4) That guidance toward civilian reemployment is given, when required, in cases where a physical disability discharge is indicated.

The redistribution program has been developed by the office of the Assistant Chief of the Air Staff, Personnel, and because of its widespread application and definite departure from the old hit-or-miss assignment system, progress of the plan is being watched by other branches for possible adaptation to the entire military service.

As a supervising agency for the program, the AAF Redistribution Center has been established within the office of the A/C of Air Staff, Personnel, and headquartered at Atlantic City, N. J. The Center will act with full authority and in close coordination with the Office of the Air Surgeon.

Necessity for a redistribution program of some sort became apparent last winter, coincident with the increase in the number of returnees from overseas theatres. It was evident that several thousand returnees would have to be processed each month and there was no well-formulated system for accomplishing this. In the absence of a better method, assignments were made on the basis of reports and personnel records. The inevitable result: men reported for duty before they were sufficiently rested and before they had appetites for new jobs—and there were many misfits.

The Air Forces' solution to the problem is based on the premise that each returnee must be handled as an individual, not as a number which represents certain basic qualifications. As a result, the AAF program provides individual planning for every man returned to the States from overseas. The schedule is detailed: exactly what the returnee will do from the day he gets his farewell processing at his overseas station until he reports for his new assignment, or is given his discharge from the service for physical disability. The time consumed by the reassignment schedule will depend upon the circumstances—the returnee's and the Army's—but in no case will the returnee report for a new assignment until the AAF is satisfied that he is fit, ready and correctly placed.

Officers in charge emphasize that the program is still in the experimental stages. It is just getting into operation, and it will grow as the load grows.

As the program is now shaping up, here's what will happen to you as a returnee from a combat zone:

Any one of four reasons might account for your being sent back to the United States for reassignment:

(1) Your turn might come up in a regular rotation of overseas assignments.

(2) The Air Forces might feel that your skill and experience are needed back home.

(3) You might be suffering from fatigue.

(4) You might be disabled and in need of hospitalization.

Before you leave your overseas station, you are given a thorough physical examination and provided with clothing and equipment needed for the journey home.

At the embarkation point, Army doctors look you over again to determine whether you have a communicable disease. A recheck is made on your uniform, equipment and personnel records.

Now, assuming that you are returning by boat, you are assigned to a "reception station group" according to your home state. For example, if from Kansas, you and all the other Kansans in your contingent are assigned to the same group. The ranking officer in each group becomes the group leader.

The exception to the geographical group system is the man who is sick or injured and requires hospitalization. He returns on a hospital boat, and upon arrival to a U. S. port of debarkation is taken immediately to an Army General Hospital. It may be the hospital nearest the port or the nearest one that specializes in the kind of treatment he requires.

The boat on which you and your Kansas friends are riding docks, say, at New York City. There, you are given another physical checkup. What happens to you from that point depends on which of three physical groups you belong in:

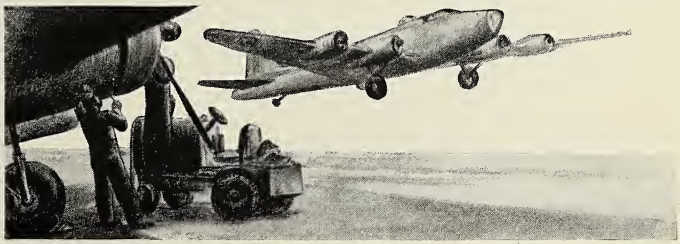
(1) Those requiring no medical treatment.

(2) Those suffering from operational fatigue.

(3) Those requiring treatment in a general hospital.

If you are in the first group, you join the other Kansans who are physically fit and board a train on which reservations have been made for you. You are still under the command of your Kansas group leader, and you travel at government expense to the interior reception station of the Army Service Forces nearest your home.

At that point your personnel records are checked and brought up to date. Assisted by a liaison officer of the AAF, you draw any uniform and equipment items needed for the furlough you are about to get. Then for twenty days you are free to go home or any other place you choose.



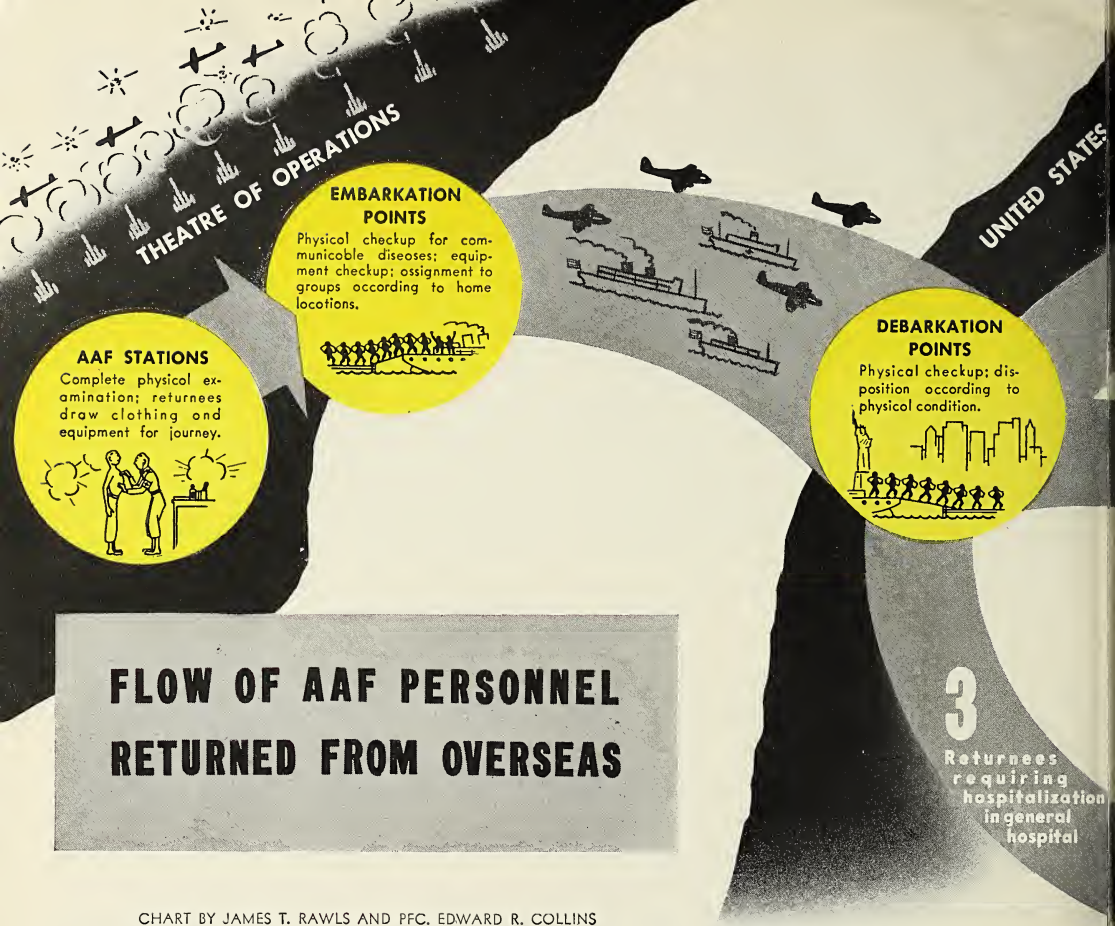


CHART BY JAMES T. RAWLS AND PFC. EDWARD R. COLLINS

Furlough travel is at your own expense.

Returnees in the second group—those suffering from operational fatigue—are sent from the port of debarkation directly to an AAF convalescent center for treatment, rest, observation and—when their condition permits—military and physical training. If it appears that a returnee's condition will not permit his return to military duties, he is given vocational training to help him obtain and hold a job when he is discharged from the Army.

The first convalescent center has been opened at Coral Gables, Fla. Others are being organized at Mitchel Field, N. Y., Jefferson Barracks, Mo., San Antonio, Tex., Buckley Field, Colo., Santa Ana, Calif., and Fort George Wright, Wash.

Members of the third group—those requiring hospitalization—are treated in a general hospital and later sent to a convalescent center. Men who make the return crossing by air are handled in the same manner as those who arrive by boat. Upon debarkation at Miami, Fla., for example, the schedule at the airport is similar to that at the ship landing point.

But to get back to you and the home folks in Kansas, upon the expiration of your 20-day furlough, you will report to an AAF redistribution station in the general geographical area of your home, where your quarters for the next couple of weeks will be a hotel which not long ago was catering to vacation clientele. It has been leased by the government to house you and other returnees while personnel officers study your case and decide on your next job.

Two redistribution stations are now operating, one at Miami Beach and the other at Atlantic City. A third is being established on the west coast and a fourth in the midwest.

Your rank will not affect the treatment you get in the redistribution center. Whether you are an officer or an enlisted man, you will have a roommate, and you will get the same food, the same accommodations and the same attention from personnel officers as your superiors and inferiors.

Your program will be planned for you, but ample time will be left for pursuits of your own choosing. You will be urged to enjoy your time in this station. The personnel officers want to see you under the best possible conditions. They want you to be in a good frame of mind. They want to separate you from a barracks atmosphere.

Without hurry or bustle, they will give you orientation talks and interview you. There will be no punch-card system to find your slot, no heads-you-go-here, tails-you-go-there. You *(Continued on Page 5)*

1 Returnees not requiring medical treatment

2 Returnees suffering from operational fatigue

INTERIOR RECEPTION STATIONS

Personnel records brought up to date; uniforms and equipment checked and necessary replacements made; furloughs granted.

HOME ON FURLOUGH

Approximately 20 days.

REST CAMPS

Rest; recreation; orientation; conditioning.

AAF REDISTRIBUTION STATIONS

Orientation; personal interviews; equipment checkup; physical examination; assignment; rest; recreation.

AAF CONVALESCENT CENTERS

Treatment, rest and observation; military, vocational and physical training.

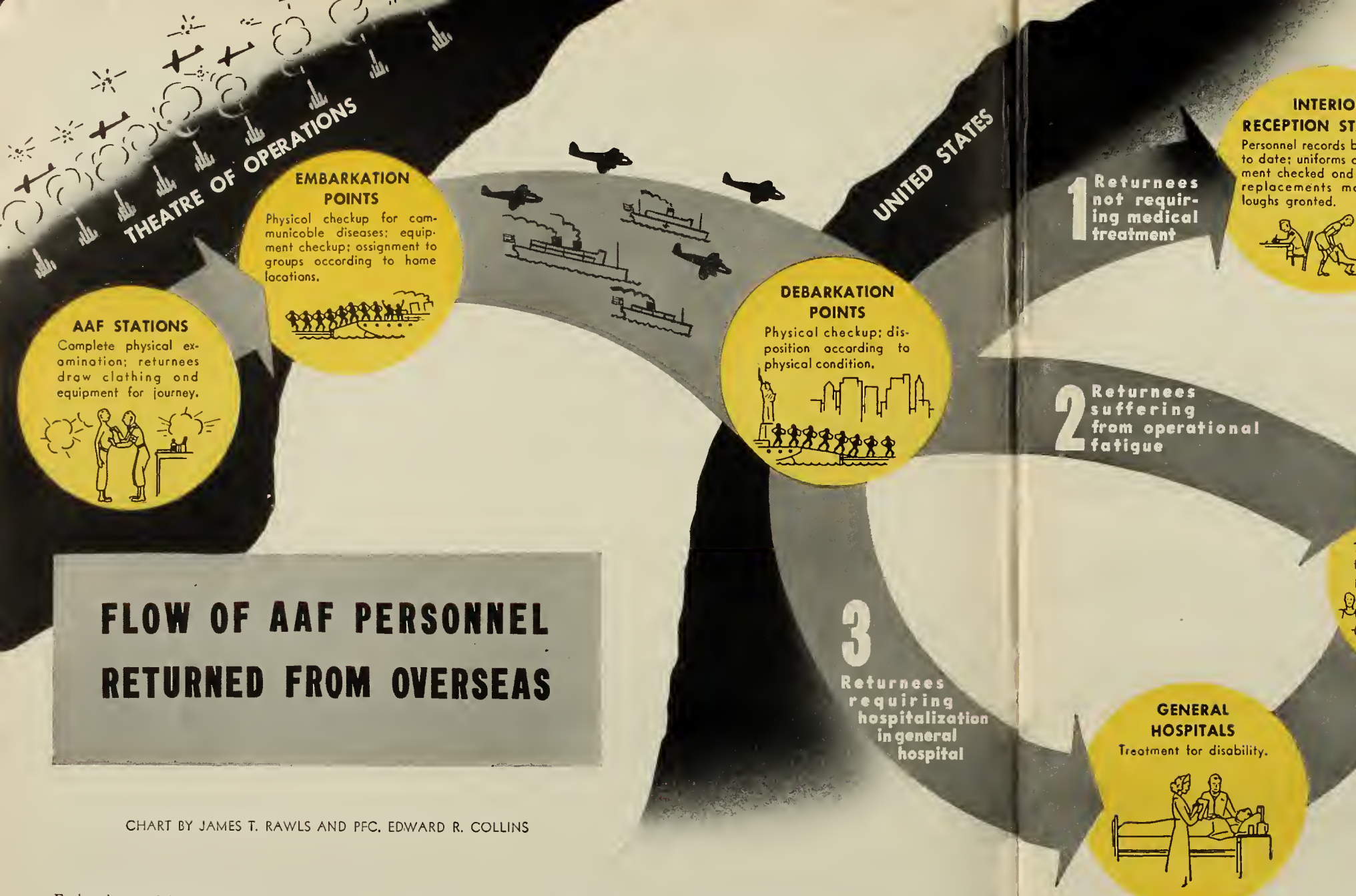
GENERAL HOSPITALS

Treatment for disability.

DISCHARGE FOR PHYSICAL DISABILITY

Guidance toward re employment as required.

DUTY ASSIGNMENT



FLOW OF AAF PERSONNEL RETURNED FROM OVERSEAS

CHART BY JAMES T. RAWLS AND PFC. EDWARD R. COLLINS

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will be an individual as well as a soldier, with problems and preferences and skills and shortcomings.

It may develop, of course, that the personnel officers will decide you still aren't ready for a new assignment. Perhaps you are more fatigued than you yourself realized.

In that event you will not be sent directly from the redistribution station to your new assignment. If you appear to be a severe fatigue case, you will be sent to a convalescent center. But more likely, you will go to a rest camp, an AAF station set up for the kind of recreation and relaxation that will condition you for a new job.

THE returnees who go to rest camps aren't patients. They don't receive treatment, as such. But they do go fishing, play golf, swim, get a lot of sun and a lot of exercise. How long a man stays depends upon his condition and how quickly he responds to the good life he lives.

Two rest camps are in operation, one at Lake Lure, N. C., and another at Castle Hot Springs, Ariz. A third will be established in the midwest and a fourth on the west coast.

From the rest camps and convalescent centers alike, returnees funnel back through the redistribution station. That applies to men who go to the convalescent center directly from the port of debarkation as well as those who are assigned to the center from a redistribution station.

As another important part of the redistribution program, plans are being made to help find jobs for men who are discharged for physical disability. Personnel officers are coordinating this program with other organizations engaged in such activities—the War Manpower Commission, the Selective Service System, the U. S. Employment Service and the Red Cross.

The AAF is in position to know—and to recommend to prospective employers the kind of industrial job that would utilize the training an individual has had in service or in a convalescent center. As a preliminary step in making certain that such training is utilized, the redistribution organization is preparing a manual to show specifically the list of jobs for which each type of AAF service could be expected to qualify a man.

The redistribution system is set up to handle the gradually increasing load of returnees from overseas. Obviously, it would not be equipped to handle a greatly increased load with such thoroughness. The program, therefore, must remain flexible.

The post-war problem, when the load will reach flood proportions, is another matter. It is expected that the AAF redistribution system will help to point the way toward solution of personnel problems when the day of victory comes. ☆

FLIGHT NURSE

By Lieut. Henrietta Richardson

ONE HUNDRED AND THIRTY-TWO hours of combat evacuation flying in North Africa convinced me that the psychological effect of the presence of an American nurse on duty in actual flight is sometimes just as important to our wounded men as her attention to their physical comforts.

During the two months I served with our Evacuation Squadron as a flight nurse we flew an evacuation mission a day, sometimes totalling 87 hours a month. My chief job was to see that the wounded men—usually eighteen patients to a plane—were made as comfortable as possible in the flight from front lines to base hospital. This meant giving medications and hypodermics to ease pain, reinforcing bandages, administering oxygen and blood plasma when needed, or just handing out some rations to patients who were hungry.

But in those planes, thousands of feet above the earth, I found that a nurse can have a definite morale effect on these men, and therein lies perhaps the hardest part of our jobs. Each patient requires individual attention. Many of them are seriously wounded and are suffering from those first few hours or days of shock. They have not yet had time to adjust themselves to their handicaps. In many cases this state of extreme sensitivity on their part calls for all the tact and understanding a flight nurse can give them.

One of the boys may be bursting to tell you how he got his leg shot off. Just telling his story to someone who will listen seems to have a real therapeutic value. He gets it off his chest, every little detail, and then he seems to feel better. And very often, I've found they tell you things they probably wouldn't mention to their own buddies.

On the other hand, on the same ship you might have another patient who doesn't even want you to mention his wounds or how he got them. He just won't discuss it—or anything. So you learn when to try to cheer up people, and when to keep your mouth shut.

Most of them just want you to listen to them. You should see their eyes light up when they see an American girl on the plane. "Gosh," they exclaim, "a nurse! And on an airplane." They seem to think it really quite wonderful. They fire questions at you. How long have you been over here? Where do you come from? Do you know so-and-so there?

Here, when they need her most, is an American girl to talk to. For the short duration of that flight, any flight nurse for the moment is mother-sister-wife and the girl-they-left-behind, all in one. They want to tell you everything—what that girl looked like (and if they're lucky enough to still have her picture they'll drag out an old, worn wallet and show you her photo, or maybe it's a snapshot of the young son they haven't seen), or they talk about that job they had in Oregon before the war, or that big time one night down in "San Antone."

Chiefly, they want to know how soon they can get back in action. Even the most seriously wounded want to get back for another crack at the Nazis. One curly-haired kid we brought to Oran one day had lost his leg in a B-26 gun turret. All during the flight he kept talking about going back to the States, getting fixed up with an artificial leg so he could come back and fly in that B-26 again.

The one thing you never hear from any of these men is one word of complaint. You ask them if they need anything, but you practically have to beat them over the head before they'll admit they would feel better with a dressing changed. "I'm all right," they will say. "Maybe somebody else wants something." ☆

PICTURE CREDITS

FIRST, THIRD AND FOURTH COVERS: AIR FORCE Editorial Office staff photos. 22-23: Acme News-pictures. 28-29: AIR FORCE STAFF and AAF. 30-31-32: Office of Flying Safety. 35: Roger's Studio, New Haven, Conn. 44-45: AAF First Motion Picture Unit. 51: Boeing Aircraft. All other photographs secured through official Army Air Forces sources.

REGENSBURG MISSION

By LIEUT. COL. BEIRNE LAY, JR.
8TH AIR FORCE

THIS report does not attempt to render a complete summary of the mission. It is merely an eyewitness account of an ordeal in which our group fought its way through fierce and prolonged enemy fighter attacks and accurately bombed a vital target.

When our group crossed the coast of Holland at our base altitude of 17,000 feet, I was well situated to watch the proceedings, being co-pilot in the lead ship of the last element of the high squadron. With all of its 21 B-17Fs tucked in tightly, our group was within handy supporting distance of another group, ahead of us at 18,000 feet. We were the last and lowest of the seven groups that were visible ahead on a southeast course, forming a long chain in the bright sunlight—too long, it seemed. Wide gaps separated the three combat wings.

As I sat there in the tail-end element of that many miles long procession, gauging the distance to the lead group, I had the lonesome foreboding that might come to the last man about to run a gauntlet lined with spiked clubs. The premonition was well founded.

Near Woensdrecht, I saw the first flak blossom out in our vicinity, light and inaccurate. A few minutes later, two FW-190s appeared at one o'clock level and whizzed through the formation ahead of us in a frontal attack, nicking two B-17s in the wings and breaking away beneath us in half-rolls. Smoke immediately trailed from both B-17s, but they held their stations. As the fighters passed us at a high rate of closure, the guns of our group went into action. The pungent smell of burnt powder filled our cockpit, and the B-17 trembled to the recoil of nose and ball turret guns. I saw pieces fly off the wing of one of the fighters before they passed from view.

(On August 17 heavy bombers of the 8th Air Force carried out a double-edged attack against the German roller bearing works at Schweinfurt and the Messerschmitt plant at Regensburg. Despite what was termed the "greatest daylight aerial battle in history," targets were bombed successfully. Our losses have been estimated at 59 B-17s, against an enemy loss of 308 fighter planes. This is the report of a co-pilot on the mission, as it was submitted to his CO, with only a few deletions for security.—THE EDITOR)

Illustrated by Capt. Raymond Creekmore

Here was early action. The members of the crew sensed trouble. There was something desperate about the way those two fighters came in fast, right out of their climb without any preliminaries. For a few seconds the interphone was busy with admonitions: "Lead 'em more . . . short bursts . . . don't throw rounds away . . . there'll be more along in a minute."

Three minutes later, the gunners reported fighters climbing up from all around the clock, singly and in pairs, both FW-190s and ME-109Gs. This was only my fourth raid, but from what I could see on my side, it looked like too many fighters for sound health. A coordinated attack followed, with the head-on fighters coming in from slightly above, the nine and three o'clock attackers approaching from about level, and the rear attackers from slightly below. Every gun from every B-17 in our group and the one ahead was firing, criss-crossing our patch of sky with tracers to match the time-fuze cannon shell puffs that squirted from the wings of the Jerry single-seaters. I would estimate that 75 percent of our fire was inaccurate, falling astern of the target—particularly the fire from hand-held guns. Nevertheless, both sides got hurt in this clash with two B-17s from our low squadron and one other falling out of formation on fire with crews bailing out, and several fighters heading for the deck in flames or with their pilots lingering behind under dirty yellow parachutes. Our group leader pulled us up nearer to the group ahead for mutual support.

I knew that we were already in a lively fight. What I didn't know was that the real fight, the *anschluss* of Luftwaffe

20 mm cannon shells, hadn't really begun. A few minutes later, we absorbed the first wave of a hailstorm of individual fighter attacks that were to engulf us clear to the target. The ensuing action was so rapid and varied that I cannot give a chronological account of it. Instead, I will attempt a fragmentary report, salient details that even now give me a dry mouth and an unpleasant sensation in the stomach when I recall them. The sight was fantastic and surpassed fiction.

It was over Eupen that I looked out of my co-pilot's window after a short lull and saw two whole squadrons, twelve ME-109s and eleven FW-190s climbing parallel to us. The first squadron had reached our level and was pulling ahead to turn into us and the second was not far behind. Several thousand feet below us were many more fighters, with their noses cocked at maximum climb. Over the interphone came reports of an equal number of enemy aircraft deploying on the other side. For the first time, I noticed an ME-110 sitting out of range on our right. He was to stay with us all the way to the target, apparently reporting our position to fresh squadrons waiting for us down the road. At the sight of all these fighters, I had the distinct feeling of being trapped — that the Hun was tipped off, or at least had guessed our destination and was waiting for us. No P-47s were visible. The life expectancy of our group suddenly seemed very short, since it had already appeared that the fighters were passing up preceding groups, with the exception of one, in order to take a cut at us.

Swinging their yellow noses around in a wide U-turn, the twelve-ship squadron of ME-109s came in from twelve to two o'clock in pairs and in fours and the main event was on.

A shining silver object sailed past over our right wing. I recognized it as a main exit door. Seconds later a dark object came hurtling through the formation, barely missing several props. It was a man, clasping his knees to his head, revolving like a diver in a triple somersault. I didn't see his chute open.

A B-17 turned gradually out of the formation to the right, maintaining altitude. In a split second, the B-17 completely disappeared in a brilliant explosion, from which the only remains were four small balls of fire, the fuel tanks, which were quickly consumed as they fell earthward.

Our airplane was endangered by hunks of debris. Emergency hatches, exit doors, prematurely opened parachutes, bodies and assorted fragments of B-17s and Hun fighters breezed past us in the slip stream.

"The first squadron had reached our level . . ."

I watched two fighters explode not far below, disappearing in sheets of orange flame, B-17s dropping out in every stage of distress, from engines on fire to control surfaces shot away, friendly and enemy parachutes floating down and, on the green carpet far behind us, numerous funereal pyres of smoke from fallen fighters, marking our trail.

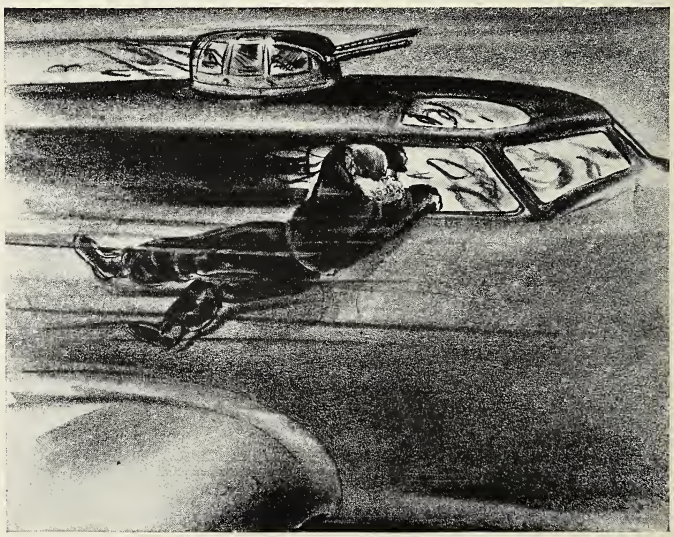
On we flew through the strewn wake of a desperate air battle, where disintegrating aircraft were commonplace and sixty chutes in the air at one time were hardly worth a second look.

I WATCHED a B-17 turn slowly out to the right with its cockpit a mass of flames. The co-pilot crawled out of his window, held on with one hand, reached back for his chute, buckled it on, let go and was whisked back into the horizontal stabilizer. I believe the impact killed him. His chute didn't open.

Ten minutes, twenty minutes, thirty minutes, and still no let up in the attacks. The fighters queued up like a breadline and let us have it. Each second of time had a cannon shell in it. The strain of being a clay duck in the wrong end of that aerial shooting gallery became almost intolerable as the minutes accumulated toward the first hour.

Our B-17 shook steadily with the fire of its fifties and the air inside was heavy with smoke. It was cold in the cockpit, but when I looked across at our pilot— and a good one—sweat was pouring off his forehead and over his oxygen mask. He turned the controls over to me for a while. It was a blessed relief to concentrate on holding station in formation instead of watching those everlasting fighters boring in. It was possible to

". . . reached back for his chute"

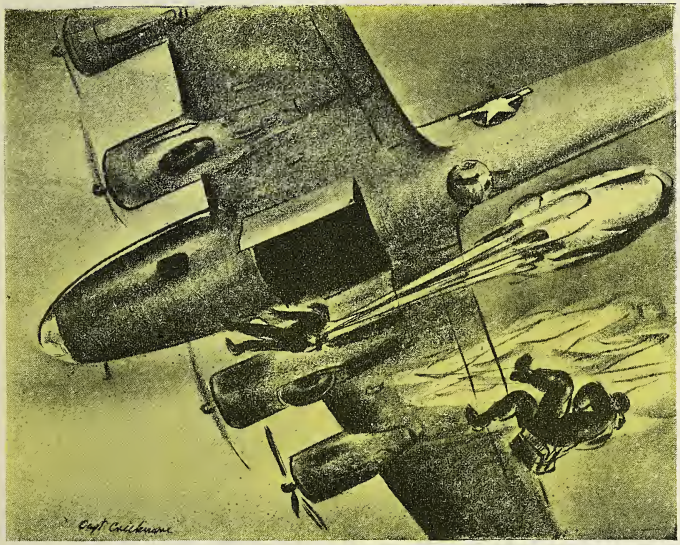


forget the fighters. Then the top turret gunner's twin muzzles would pound away a foot above my head, giving an imitation of cannon shells exploding in the cockpit, while I gave an even better imitation of a man jumping six inches out of his seat.

A B-17 ahead of us, with its right Tokyo tanks on fire, dropped back to about 200 feet above our right wing and stayed there while seven of the crew bailed out successively. Four went out the bomb bay and executed delayed jumps, one bailed from the nose, opened his chute prematurely and nearly fouled the tail. Another went out the left waist gun opening, delaying his chute opening for a safe interval. The tail gunner dropped out of his hatch, apparently pulling the ripcord before he was clear of the ship. His chute opened instantaneously, barely missing the tail, and jerked him so hard that both his shoes came off. He hung limply in the harness, whereas the others had showed immediately some signs of life after their chutes opened, shifting around in the harness. The B-17 then dropped back in a medium spiral, and I did not see the pilots leave. I saw it just before it passed from view, several thousand feet below us, with its right wing a solid sheet of yellow flame.

After we had been under constant attack for a solid hour, it appeared certain that our group was faced with annihilation. Seven had been shot down, the sky was still mottled with rising fighters and target-time still 35 minutes away. I doubt if a man in the group visualized the possibility of our getting much farther without 100 percent loss. I know that I had long since mentally accepted the fact of death and that it was simply a question of the next second or the next minute. I learned firsthand that a man can resign himself to the certainty of death without becoming panicky. Our group firepower was reduced 33 percent, ammunition was running low. Our tail guns had to be replenished from another gun station. Gunners were becoming exhausted and nerve-tortured from the prolonged strain, and there was an awareness on everybody's part that something must have gone wrong. We had been the aiming point for what seemed like most of the Luftwaffe and we fully expected to find the rest of it primed for us at the target.

Fighter tactics were running fairly true to form. Frontal attackers hit the low squadron and lead squadron, while rear attackers went for the high. The manner of their attacks showed that some pilots were old-timers, some amateurs, and that all knew pretty definitely where we were going and were inspired with a fanatical determination to stop us before we got there. The old-timers came in on frontal attacks with a noticeably slower rate of closure, apparently throttled back, obtaining greater accuracy than those that bolted through us wide out. They did some nice shooting at ranges of 500 or more yards, and in many cases seemed able to time their thrusts to catch the top and ball turret gunners engaged with rear and side attacks. Less experienced pilots were pressing attacks home to 250 yards and less to get hits, offering point-blank targets on the breakaway, firing long bursts of twenty seconds, and, in some cases, actually pulling up instead of going down and out. Several FW pilots pulled off some first rate deflection shooting on side attacks against the high group, then raked the low group on the breakaway out of a side-slip, keeping the nose cocked up in the turn to prolong the period the formation was in their sights.



". . . one bailed from the nose, opened his chute prematurely"

I observed what I believe was an attempt at air-to-air bombing, although I didn't see the bombs dropped. A patch of 75 to 100 grey-white bursts, smaller than flak bursts, appeared simultaneously at our level, off to one side.

One B-17 dropped out on fire and put its wheels down while the crew bailed. Three ME-109s circled it closely, but held their fire, apparently ensuring that no one stayed in the ship to try for home. I saw Hun fighters hold their fire even when being shot at by a B-17 from which the crew was bailing out.

Near the I.P., one hour and a half after the first of at least 200 individual fighter attacks, the pressure eased off, although hostiles were nearby. We turned at the I.P. with fourteen B-17s left, two of which were badly crippled. They dropped out after bombing the target and headed for Switzerland. The No. 4 engine on one of them was afire but the plane was not out of control. The leader of the high squadron received a cannon shell in his No. 3 engine just before the start of the bombing run and went in to the target with the prop feathered.

Weather over the target, as on the entire trip, was ideal. Flak was negligible. The group got its bombs away promptly on the leader. As we turned and headed for the Alps, I got a grim satisfaction out of seeing a column of smoke rising straight up from the ME-109 shops, with only one burst over in the town of Regensburg.

The rest of the trip was a marked anticlimax. A few more fighters pecked at us on the way to the Alps. A town in the Brenner Pass tossed up a lone burst of futile flak. We circled the air division over Lake Garda long enough to give the cripples a chance to join the family, and we were on our way toward the Mediterranean in a gradual descent. About 25 fighters on the ground at Verona stayed on the ground. The prospect of ditching as we approached Bone, short of fuel, and the sight of other B-17s falling into the drink, seemed trivial matters after the nightmare of the long trip across southern Germany. We felt the reaction of men who had not expected to see another sunset.

At dusk, with red lights showing on all of the fuel tanks in my ship, the seven B-17s of the group still in formation circled over Bertoux and landed in the dust. Our crew was unscratched. Sole damage to the airplane: a bit of ventilation around the tail from flak and 20 mm shells. We slept on the hard ground under the wings of our B-17, but the good earth felt softer than a silk pillow. ☆

Proper position for the head and sextant in the spherical astro-dome is demonstrated (left) by Colonel Thurlow. This position allows for a minimum of refraction error. At right is shown the correct position as viewed from inside the plane.

HOW TO USE THE ASTRO-DOME

By Col. Thomas L. Thurlow

Chief, Instrument and Navigation Unit, Wright Field

Navigation of the skyways has presented many problems in the short period of its existence. Most of them, however, have been solved by years of engineering and design and the introduction of "miracle gadgets" that have made possible our globe-girdling flights and operations.

Yet one drawback has been the human element—the proper use of navigational devices that go into present day aircraft. Currently we are faced with a problem regarding the use of the astro-dome in the navigator's compartment of medium and heavy bombers and cargo transports.

The spherical dome in use today is as near perfect as a dome can be, yet there are many navigators who will not trust celestial observations taken through it. This dome has several marked advantages over other types and therefore should be understood and used to the full extent of its capabilities.

Navigators are concerned with the passage of light through glass (or plastic) with parallel surfaces and through glass with wedged surfaces. A ray of light passing through "parall" glass or plastic executes a "jog" when cutting the substance, but its initial and final directions in space remain the same. The ray is displaced but it is not deviated and no error results. This is illustrated in *Figure 1A*. When a ray of light passes through wedged glass or plastic it is both displaced and deviated, as shown in *Figure 1B*. The deviation in this latter case causes an error in the observation.

Vision through a perfect spherical dome will be distorted unless the light rays which afford vision are collected at the center of the sphere by the eye, if scanning, or by the rotating sextant prism if observing.

When the newcomer looks through the standard spherical dome now fitted to several types of AAF airplanes and discovers—to his amazement and worry—that the dome distorts his vision he immediately (and unwisely) condemns it. He is looking through an ever-varying wedge as he surveys surroundings through the dome and naturally there is a varying, noticeable distortion of the objects viewed. However, an important consideration is generally overlooked in such hasty condemnation. Light from a celestial body enters the dome in parallel rays. The only part of the light from a particular celestial body that a navigator can use is the small bundle of parallel rays that his eye receives—a bundle with a diameter equal to the diameter of the pupil of his sighting eye. During any one observation then, the navigator is using only a very small portion of the dome. To judge properly the quality of the dome, the whole of it except this small, pupil-size spot, should be rendered opaque. Then both deviation and distortion are so difficult to detect that they cannot be seen with the naked eye and must be measured with laboratory instruments.

Aerodynamic considerations demand that the navigator's dome be small. A full hemisphere cannot be tolerated and, as a result, a segment of a sphere has to suffice. The standard observing dome is a six-inch segment of an eleven-inch sphere. Several considerations influenced the selection of this particular sphere, and it is considered a very reasonable compromise.

Although the navigator uses only a small (pupil-size) area of the dome when making an observation, the surfaces of the area are "wedged." The amount of wedge varies with the measured altitude and with the position of the sextant. The effect of this positional error of the sextant and the reason for the existence of the wedge is illustrated in *Figure 2*. When the sextant is held quite close to the dome, the wedge effect—and hence the deviation—may become excessive. When it is held farther away, the wedge effect is generally reduced. These two conditions also are illustrated in *Figure 2*.

If the sextant is held in a fixed position with respect to the axis or to the flange of the dome, the refraction error will vary only as the measured altitude varies and can be allowed for. If this fixed sextant position is well away from the surface of the dome, the error will be at a minimum. To keep the dome shallow, and thereby aerodynamically "clean," it was designed to be used with horizontal line of sight sextants such as the A-10 and the new AN instrument. These instruments are now delivered with a support arm in the carrying case. The support arm can be attached to the metal fitting at the top of the dome with a standard aircraft bolt. The sextant incorporates an eye that permits it to be supported by the shock-mounted hook of the support arm. Thus,

the sextant is both supported and POSITIONED by the support arm. When the sextant is so positioned, the refraction varies only with the measured altitude. The following corrections are to be applied to the altitude measured:

Sextant Altitude	Correction
10	—2
20	—3
30	—4
40	—4
50	—4
60	—4
70	—4
80	—4

The quality of the standard dome is such that the above corrections should never vary more than two minutes of arc from dome to dome. This maximum variation is the price the navigator pays for complete sky coverage with a simple and light dome installation.

Some navigators claim fantastic refraction errors of one or two degrees. If errors differing more than a few minutes from those listed in the above table are encountered, they are due entirely to the position of the sextant in the dome. No such errors are possible when the support arm is used.

Although the support arm is a distinct aid and is strongly recommended, it is not an indispensable item of equipment. The sextant can be held easily in almost the exact position in which the arm supports it after one or two trials.

Every navigator should understand the operation of the astro-dome and learn to employ it correctly.

The support arm for the A-10 sextant and that for the AN sextant are designed to position the rotating prism of the sextant approximately one inch above the flange of the dome and slightly less than three inches from its axis, in the direction of the body being observed. When the sextant is in the position the observer's eye is slightly below the dome flange and the back of his head clears the dome by more than an inch.

The mounting holes in the flange of the dome are slotted to allow the dome to expand or contract with temperature changes. Therefore, care should be taken that the hold-down bolts are not pulled up too tightly. If the dome is distorted for this reason, serious refraction errors may result. Aircraft manufacturers apparently fail to take this into account, so the navigator should check this matter personally.

If the navigator does not have a support arm, he should learn to position his sextant correctly by practicing the following drill a few times. This drill applies only when using the A-10 and the AN sextants:

Set the sextant for zero degrees altitude.

Make a horizontal mark on the dome one inch above the flange.

Lower or raise the head in the dome until the horizontal mark on the dome when seen through the instrument bisects the field of view (or bisects the bubble if the dome is level). If the dome is not level take care that the vertical axis of the sextant is parallel to the axis of the dome.

Lean back until the head touches the dome, and then forward slightly for comfortable head clearance.

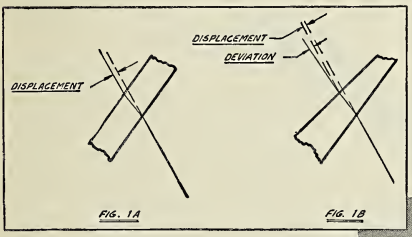
If the observer is sighting straight across the dome, that is, if he is not leaning to right or left, the sextant is being held correctly and the dome refraction errors of the foregoing table apply.

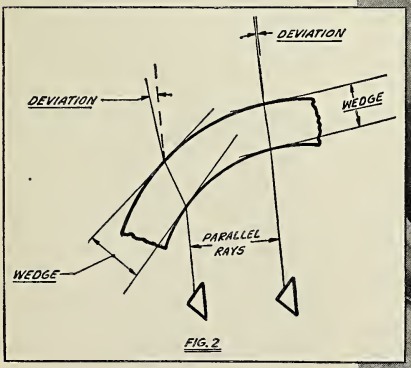
The standard spherical dome is not of sufficient height to permit the use of "down-sighting" sextants such as the A-5 and the A-7 instruments, or the A-6 and A-8 instruments when they are not being used for direct viewing of the body being observed.

Many navigators prefer the A-6, A-8 (Bausch and Lomb) and the A-12 (Link) sextants used as direct viewing instruments. When using these there is but one rule to observe: *Position the head so that the line of sight is perpendicular to the surface of that portion of the dome being used.*

This rule cannot be complied with when the altitude of the body observed is less than twenty degrees, and a correction of two minutes of arc should be applied to the measured altitude. Above twenty degrees, if the head is positioned in accordance with the above rule, no dome refraction correction need be applied.

The navigator should make every attempt to understand the operation of the astro-dome and to use it correctly before criticizing it. He should bear in mind that it required years of insistent persuasion to convince the aerodynamists and those concerned with aircraft performance that a sacrifice to help the navigator was necessary. The same people will be quite willing to remove the dome if the navigators themselves condemn it. ☆





In the flat glass dome of a trainer, the proper head and sextant positions are demonstrated.

OUR DEVELOPMENTS IN FIREPOWER

By COL. FRANK C. WOLFE
CHIEF, ARMAMENT LABORATORY, MATERIEL COMMAND

COMBAT experience has necessitated the re-arming of our fighting planes. The trend is toward new and significant developments in firepower, and our accomplishments are making American fighting planes the most formidably armed aircraft in the skies.

Our recent firepower development, as much of it as we can discuss at this time, includes:

- Heavier caliber machine guns.
- Heavier millimeter rapid-fire cannon.
- Hydraulic and electrically operated gun turrets with multiple gun installations.
- Remotely controlled and power-boosted and hand-held machine gun mounts.
- Remote control and fire control systems.
- Increased firepower for nose and tail positions of all types of bombers.
- Power-driven nose turrets in heavy bombers.
- Interchangeable nose turrets for a light bomber type.
- Multiple 37 mm cannon mounts in bombers for forward fire.
- Multiple gun turrets for night fighters.
- Forward-firing fixed 20 mm cannon in a light bomber type.
- Fixed gun installation for fighter aircraft to provide automatic corrections for lead, range, altitudes and speed.
- Improved computing sights for all gun positions.
- Emphasis on placement of guns to assure maximum protection.
- Fighter gunsights which extend present sighting ranges.
- Combination gunsights and dive bombsights.
- Personnel flak suits and armored helmets.
- Improvements in armor plate and bullet-resistant glass.
- Improvements in the gunsight aiming-point camera.

THE firepower problem is not new. Arming of aircraft dates back to the days at College Park, Md., in 1909 when the Wright brothers were training our first military aviators — among them today's Commanding General of the Army Air Forces, General Henry H. Arnold. There the first machine gun, carried in the lap of a passenger, was fired at a ground target from a flying machine. Crudely fashioned bombs also were taken aloft and dropped on targets.

Subsequent steps in converting the airplane into an effective military weapon were made during the first World War when Germans and Allies introduced new methods of fitting their planes with machine guns and bombs. As early as 1915 German observers flying over Paris fired rifles at French aircraft in the air. The French retaliated with automatic rifles. Later, machine guns mounted on the wing, shooting over the propeller, and located at various other positions on the airplane, were introduced. Next, guns were synchronized to fire through the propeller. From then on, Germans and Allies increased the firepower of their aircraft. The French used the first cannon, a 37 mm Hotchkiss, on the Voisin airplane. Guynemer, the French ace, used a similar cannon, firing through the propeller shaft of a Hisso engine, in a SPAD plane. It proved effective against aircraft and balloons. Leak-proof gasoline tanks and armor plate came too late—the war was over before much could be done about their practical application.

Records of these actions were shelved in War Department files until preparation for the current war brought them out again. Although aircraft were faster and more maneuverable when war came to the world in September, 1939, it caught American warplanes with their flaps down. Armament had not kept pace.

The few fighting planes that we had at that time were woefully lacking in needed firepower. Some of our fighter types had only one .30 caliber gun and one .50 caliber gun mounted side by side, firing through the propeller. These ships became obsolete overnight when World War II ushered in the era of the "flying gun platform." Yet, we had powerful bombers and speedy fighters "in the works."

Today, these ships and other aircraft of the Army Air Forces are carrying heavy firepower to the enemy.

Creating this sting, while adapting idea changes from the operational theatres, is the task for armament personnel of the Air Forces; more specifically, the job for the Materiel Command's Engineering Division Armament Laboratory at Wright Field.

War greatly accelerated the laboratory's job. Once a small, three-room office buried in the midst of hangars and shops at Wright Field, this laboratory was fed millions of dollars for experimental purposes and expanded into the largest aeronautical armament research center in the world.

In an effort to maintain superiority over enemy developments in firepower, our armament laboratory is continually working toward modernization or improvement of aircraft installations now being used in combat.

Aircraft fire control is a new art. This war's trend toward a battlefield in the stratosphere has spawned heretofore untried types of aircraft armament. One solution is the use of remote fire control systems which remove the gunner from the proximity of his guns, diminishing the effects of vibration on the sighting operation and allowing for greater comfort and less fatigue for the gunner.

Paralleling the development of these remote control systems, high priority is being given to heavier caliber guns and cannon for such installations.

Great advancement has been made in the application of heavy caliber cannon for fighter offensive use and as defensive installations in bombers. Much stress has been placed on power-driven turrets for all sizes of machine guns and cannon. Such installations include locally operated, remotely controlled and power-boosted hand-held mounts. The latter are vast improvements over original single hand-held flexible guns inasmuch as larger caliber, multiple weapons can be more accurately controlled and sighted free from slipstream effect encountered at high speeds. These installations and their continued improvement have done a great deal toward commanding respect from enemy fighters.

For example, just after Pearl Harbor, the Japs found B-17s without tail guns easy prey, and accounted for several of the bombers by rear attacks. Two .50 caliber guns were installed in the B-17 tail and on one particular flight (the first time the new guns were used in combat), the tail gunner of one Fortress shot down seven Jap fighter planes.

These early installations have been improved so that today tail gunners have more firepower and, in some cases, turrets have replaced the flexible guns. This increases effectiveness since turret fire is more accurate than the hand-held gun with its excessive vibration.

Machine guns fire from 600 to 1,200 rounds of ammunition per minute, depending upon the type of gun, caliber, temperature, synchronization and the design and location of all accessories such as feed chutes, ammo boxes and means of ejection. However, rate of fire must not be over-emphasized. Guns are rarely fired in long bursts. In air combat a pilot seldom holds his trigger for bursts that exceed 25 rounds. If fire duration is exceeded, guns will become overheated and unintentional firing, damaged barrels and other serious malfunctions will result.

What constitutes adequate firepower for modern aircraft frequently becomes the object of discussion among those not familiar with this all-important factor in air warfare. The mere presence of numbers of guns or cannon, irrespective of caliber, is not indicative of true firepower. Each airplane must of necessity be treated separately during its initial design when every conceivable consideration is given to the number of weapons, their caliber and, above all, their placement in the aircraft to assure maximum protection.

We have been fortunate in having a wide size range in aircraft weapons—from the small .30 caliber machine gun, capable of firing 1,200 rounds per minute and weighing less than 25 pounds, to the larger cannon which fires at a much slower rate. However, American firepower today is relying on the .50 caliber machine gun. It is the weapon most commonly employed in our aircraft.

This gun, hailed as the finest arm of its kind in the world, weighs approximately 65 pounds, and is capable of firing 800 rounds per minute. Relatively small in size, it fits easily into all of our aircraft types. The projectile leaving the muzzle at a speed of over 2,900 feet per second can penetrate any kind and all parts of an airplane. And the shell is small enough for as many as 1,000 rounds per gun to be carried. During one test the .50 caliber was fired at an obsolete bomber fuselage. It smashed the bomber's skin, ammunition boxes, a longeron, a hard pine board and then pierced a 7/16-inch piece of armor plate.

The .50 caliber gun has an effective range of four miles and from that distance still packs sufficient wallop to kill a man. Another measure of its force can be brought out when it is estimated that bullets from the eight guns on a Republic P-47 firing together deliver to an enemy target more horsepower punch than the 2,000 hp engine which pulls the ship through the air.

THE number of guns carried in an airplane depends largely on the airplane's configuration. In bomber types the guns usually are mounted in pairs which are disposed from nose to tail to afford protection from every conceivable direction of attack. In fighter types the number of guns varies from four to eight.

By comparison, a flight of thirteen Republic Thunderbolts, each with eight .50 caliber guns, has three times the striking power of a machine gun unit of a German infantry regiment. A formation of thirteen bombers, carrying a new heavy millimeter cannon now going on some of the medium types, carries twice the firepower of the 75 Howitzer used by the Nazi regiment. A single flight of thirteen Airacobras, carrying .37 mm cannon, is equal to the anti-tank guns of the regiment.

Downing an airplane with gun fire is not simple; it is difficult to keep a fast moving target in range. This means that

"We are designing guns and putting wings on them."

This small movie camera in the nose of a P-38 is used as an aid in improving firing accuracy. Visible in the photo above are three .50 caliber machine guns and one 20 mm cannon.

a gunner must fire more rounds in a given time interval to assure a hit on a speeding airplane. In one sense the perfection of the machinery provided the gunner can be considered a measure of his firepower. If each time the gunner squeezed the trigger he could be assured a hit, obviously one gun would be adequate. However, because of the complications involved—the ballistic behavior induced when a projectile is fired from an airplane, the human element, and the speed and maneuverability of the airplane target—aerial gunnery is a complicated procedure.

Our bombers for some time have been using computing sights which have forced enemy fighters to remain at a range from which their firepower is ineffective. These computing sights continually are being improved. The problems involved in correcting completely for aircraft gun-laying are many and, to obtain hits, they must be solved to a fine degree of accuracy. These solutions include accurate and instantaneous computation of and correction for lead and ballistic variations caused by altitude, range and speed of the firing airplanes. In fact, the corrections obtained through use of computers parallel those of the secret bombsight, but actually involve a greater number of factors which must be solved with even less assistance from the gunner.

In the last war the ordinary ring and bead sight was used as standard for all aircraft guns. Now the ring and bead sight is used only on hand-held guns. Reflector sights eliminate the need for lining up the gunner's eye and front and rear sights with the target since the sight itself actually projects a sight reticle image onto a transparent reflector plate which, at infinity, moves with the gunner's eye. Thus, although the gunner's head may be in continual movement in rough air, the sight line and target remain together.

Although the use of computing sights thus far has been limited to turrets, additional computing sights have been developed and placed in production for use in all other gun positions. A large amount of credit is due the various fire control system manufacturers for their research and development.

The gunsight aiming-point camera is proving highly beneficial in improving the accuracy of our gunners. A small compact camera, carrying 16 mm motion picture film in its magazine, is mounted

Below is a scene in the "torture chamber" of the armament lab at Wright Field, where gun barrels are tested to see how long they can take it. This man fires as many as 8,000 rounds of ammunition a day trying to "burn out" a gun.

behind the gunsight taking a picture of the sight reticle as it is projected on the target. Thus, it is possible to study exactly what the gunner has seen through the gunsight, and evaluations and corrections can be made to improve his aim. Quick-processing film enables this study to be made a few minutes after the gunnery practice—or actual air combat—since some of the cameras have already been employed in battle areas. While the gunner's errors are still fresh in his mind, he can see what should have been done to improve his effectiveness.

Recently, instructors at a gunnery school revealed that before using the gun camera their students scored 22.4 percent hits in ground gunnery and 4.7 percent hits in aerial gunnery, but after they had used the camera and studied their faults, the hit percentage was jumped to 27.5 percent for ground gunnery and 43.5 percent for aerial gunnery. Later, in trying for gunnery records, those trained on the gun camera scored 58.75 percent on ground gunnery and 59.5 percent for aerial gunnery. Thirty percent of gunners have been rated as experts after being trained in use of this camera.

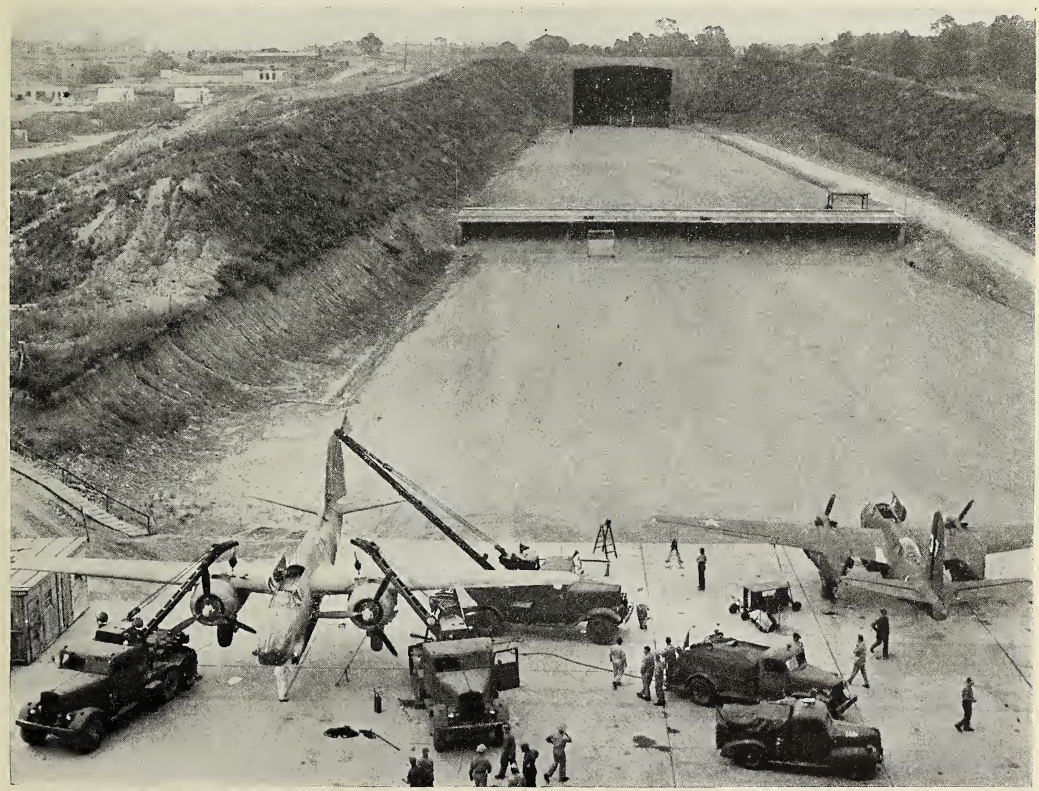
Two main factors in aerial gunnery determine the accuracy of gun fire following automatic computation — *tracking* and *ranging*. Unless the gunner tracks smoothly and ranges precisely, the computing gunsight will be given inaccurate data on which to base its calculation. Tracking involves keeping the gunsight precisely on the target without deviation, while ranging refers to manipulation of the sight's range-measuring mechanism to keep the correct range constantly in the computer. Both are done in turrets by wrist or feet movements.

The pictorial record of the gunsight aiming camera enables the gunner to see his errors and to make corrections in succeeding trials.

Advancements in aircraft armament over the last four years have necessitated the development of new armament testing facilities including indoor and outdoor firing ranges, cold rooms for test firing at extremely frigid temperatures, high altitude pressure chambers, sight and computer testing devices and advanced electronic tests. Because our aircraft are fighting in extremely high desert temperatures and extremely low arctic temperatures, it has been necessary to design armament equipment for perfect operation in all climatic and atmospheric conditions. The temperatures under which armament items are tested range from minus 65 degrees to plus 160 degrees Fahrenheit. A recently completed cold test firing room at the Wright Field armament laboratory is proving invaluable in the investigation and testing of all equipment. In the high altitude pressurized chambers, strange phenomena of armament operation are being investigated continually.

From studies of the reaction of guns and their firing mechanisms to cold conditions, researchers have developed new greases and oils that allow smooth opera-

On this large armament range at Wright Field the farward and rearward fire af aircraft are tested. One af the A-20s shawn here has been hoisted in the air ta simulate a candition of flight in checking an the effects of vibratian.



tion of guns at any temperature. They also have studied effects of cold and heat on the thick glass transparencies around windshields and turret installations and developed new types to offset the damaging temperatures.

In another section of the large laboratory is a "torture test" chamber where guns are fired on life tests. Mounted on a large grotesque frame, machine guns and cannon are fired for as many as 8,000 to 10,000 rounds a day to determine life expectancy of gun barrels and to make sure there is no malfunction in the gun mechanism.

Such tests produce innovations in gun design and installation methods. Armament engineers, with the splendid cooperation of Ordnance, have worked out the most efficient guns in existence. In one day this year, patent applications for seven new inventions on a particular gun were sent to Washington from the armament laboratory.

The normal procedure in the development of new items of armament equipment involves the following steps: Requirements are laid down—usually as a result of actual combat requirements which are forwarded to the Materiel Command—and preliminary specifications drawn up by the armament laboratory. These specifications in most cases are submitted to competent fire control manufacturers who conduct the necessary research development, design and fabrication of an experimental article, in collaboration with engineers at Wright Field. When the first article is completed, tests are made by the manufacturer prior to its release to the Materiel Command for further laboratory trials and installation in aircraft for preliminary air-firing. Upon satisfactory completion of this testing, the article is sent to the Army Air Forces Proving Ground Command at Eglin Field where complete functional and tactical suitability tests are carried out. If the article under test meets the requirements, it is recommended for standardization and procurement. This may seem a long drawn-out routine, but actually it is accomplished in a relatively short time, an example being the requirement for the computing sights for tail and nose positions necessitated by increasing losses of our planes from frontal and rear attacks by the enemy.

Oklahoma City Air Depot workers fasten the final bolts and screws in mounting a new stinger in the nose of a B-24. The glass front pieces are installed after the turret is tightened in place.

Conversion of the Douglas attack bomber into a night fighter was another example of meeting the demands from the front. For some time the British were using A-20s on intruder raids on the Continent—going over low, skirting between hills and dropping light fragmentation bombs on German airfields and gun installations in France. But this wasn't enough. The British wanted the plane for a fighter as well. They tried different types of gun installations in the nose of the ships. We have followed suit in converting the A-20.

Changes in armament usually mean long, drawn-out conferences behind closed doors—hard, cold fact discussions with experts from the equipment laboratory who tell us how much electrical energy we need for new installations, how much we can get and no more. Gun engineers, crack turret trouble shooters, bomb and bombsight technicians are present. We discuss the whole idea with the men who operate our training schools, teach our bombardiers and gunners. Then, from the aircraft laboratory specialists we learn how much airplane we can cut away for new installations; how much weight we can add here and take off there to keep the airplane aerodynamically stable. Some time is spent with production division men who handle the task of getting needed materials, readying a manufacturer to build the plane we desire and seeing to it that production begins immediately.

After standardization and procurement of new armament equipment, work is continued by the manufacturer and the armament laboratory to improve the article still further.

Indicating the scope of experimental projects concurrently undergoing development and testing by armament experts, there are at present approximately seventy airplanes of different types at Wright and Eglin Fields. In some cases, upon completion of the tests by Eglin Field, the airplane and experimental armament items are flown to a combat zone for further tactical evaluation before they go into actual service. All armament development projects do not originate with tactical organizations. The initiation of a new experimental airplane in most cases calls for a parallel development program on the part of the armament laboratory.

To illustrate how a new airplane may dictate new armament designs, it may be said that plans for the giant Douglas B-19 bomber called for unprecedented turret installations, before the British or any other country turned attention to the power-operated turret. The armament laboratory's task was *(Continued on page 56)*

THE MARAUDERS CAME THROUGH

B-26s leave the enemy coast after bombing a Nazi fighter base at Lille, France. Smoke is streaming from the right engine of one of the bombers as a result of flak damage, but the plane returned to base. Another B-26 is discernible near the left engine of the bomber at left.

By COL. SAMUEL E. ANDERSON

CO OF A MEDIUM BOMBARDMENT WING IN ENGLAND

ON a fine summer afternoon in July, a B-26 formation roared over the English Channel at 12,000 feet toward the railroad marshalling yards at Abbeville, France.

Above the formation hovered a watchful escort of RAF Spitfires, ready to nail the German fighters that already were rising from their bases to meet the attack.

Below the formation was the enemy coast—the hard-shelled rim of Western Europe that must be smashed for full-scale invasion.

And behind the formation were hundreds of hopes, plans and doubts that the Marauders would bomb the target and return—all of them—to base.

For this raid was an experiment. It was the first time that B-26s had been sent across the invasion front at medium altitude. They were traveling at a height within range of not only the heavy flak defenses but also the many light flak emplacements near the target area. They were flying into a territory dotted with Nazi fighter bases that protect the great German industrial areas.

I say there were doubts behind this experiment, because the first one had failed. That was a low-level attack by a B-26 formation two months earlier in which disastrous casualties were suffered. Regardless of the reasons for the failure of the first experiment, everyone from the pilots down to the last grease-marked mechanic waited in tense expectancy for the results of the new tactics against the Luftwaffe and the heavy German ground defenses.

There were some who even doubted whether the Marauder could operate successfully at any altitude, or under any conditions, in the European theatre. And that attitude was applicable to all types of medium bomber. The RAF had only a handful of Venturas, Bostons and Mitchells, alternately stabbing the Nazi defenses at both medium and low level. Maj. Gen. Ira C. Eaker, commanding the 8th Air Force, Brig. Gen. Robert C. Candee, commanding the 8th Air Support Command, and we of the medium bombardment wing did not agree with this attitude. Today's mission was our attempt to disprove all doubts.

Some questioned whether B-26s could operate successfully over Western Europe but this experimental raid dispelled all doubt.

Thus it was that there was considerably more than just the bombing results riding on this formation of B-26s as they opened their bomb bay doors over Abbeville.

We were back at home base an hour later—and we all returned safely. The Spits had taken care of the FW-190s and ME-109s that had attempted to intercept, and, while some of the planes suffered damage from flak, direct hits were avoided by evasive action. A few planes, though heavily damaged, came home without great difficulty. Since that mission, B-26s have come back with one engine shot out, with rudders almost shot off, with flaps and landing gear rendered inoperative — conclusive proof that the B-26 is a tough plane which can take a lot of punishment.

This mission — this experiment — had been highly successful, and as General Candee said after our return, "It's just the beginning of continuous operations to crush the German Air Force."

Within the next two months, taking time out only for extremely bad weather, the Marauders entered into a shuttle relay across the English Channel and North Sea that totaled sixty announced raids, an average of one a day. They flew more than 2,470 sorties with a loss of only

eleven aircraft, and dropped more than 2,800 tons of bombs.

Our objective has been two-fold: first, the destruction of the German fighter force in Western Europe, on the ground and in the air; secondly, the building of a battle-seasoned force to support our ground forces when they invade Europe. Although we rarely have caught the Hun on the ground, we have blasted the airdromes guarding German industry until photo reconnaissance has definitely established that many of the landing fields have been abandoned.

St. Omer, Poix, Tricqueville, Bernay St. Martin, Woensdrecht, Beaumont le Roger, Caen/Carpiquet, Lille/Nord, Lille/Vendeville, Bryas Sud, Merville, Amiens/Glisy —these Luftwaffe fighter bases have been under continuous attack, and the wearing-down process has shown good results.

ALTHOUGH we have given about 75 percent of our attention to German airdromes, marshalling yards and an occasional industrial target have been on our schedule, too. One of the best jobs of precision bombing ever recorded was the raid on the Le Trait shipyard August 4 when a fairly small formation of B-26s placed their bombs into a target 330 by 650 yards and almost completely destroyed it. Additional hits were scored on a submarine and a tanker in the slips.

The biggest day of operations came in coordination with the "amphibious exercises" held in the English Channel on September 9. That morning we threw our Sunday punch. Our targets were coastal defenses near Boulogne which contained heavy guns ranging up to sixteen-inchers. Every fifteen minutes for two hours the Marauders were hammering the gun positions, and the effectiveness of the saturation was apparent not only in the fact that the landing craft in the exercises were not fired on, but also in the Strike photos. One photo showed at least 42 bomb craters in one emplacement containing six guns.

Aside from the obvious conclusion as to what may be expected from the medium bombers supporting a possible invasion of Western Europe, that day offered a perfect example of what may be expected from the combat crews. One of our airdromes was shut in by weather that ordinarily would give pilots a restful morning in their bunks. It was a heavy ground fog about 400 feet thick, with 100-yard ground visibility. But the crews had learned during the briefing that an Allied fleet was approaching the French coast. Although they later learned that it was an "amphibious exercise," it seemed like the real thing at the time.

Up from this fog-bound field shot the Marauders, plowing through the murk until they broke out on top where they formed into boxes and went to Boulogne. In this extremely hazardous take-off only one bomber was lost.

The total for the morning of the "amphibious exercises" was 216 sorties. We lost three, in addition to the one on take-off, which was our heaviest loss on any one mission to date.

Because of magnificent support from RAF Spitfires, which have taken care of nearly all enemy fighters, a medium bomber's biggest worry over Western Europe has been the flak. It comes in big doses, but it isn't nearly as tough as the B-26s and the combat crews who fly through it. However, the proportion of bombers to escorting fighters has risen steadily. The same number of fighters which escorted the Marauders on their first medium altitude sortie now ordinarily escort many times that number.

Many of the 26s have limped back to base looking like a sieve, and I have lost count of the ones that have come home safely on only one engine. On one occasion, a B-26 piloted by Capt. Donald L. Weiss was badly crippled by flak before it reached the target. Instead of jettisoning his bombs, Captain Weiss decided to make his run over the target on one engine. Losing altitude, he had fallen out of formation, but he fulfilled his mission.

After putting his bombs on the target, Captain Weiss turned again toward England and took evasive action all the way out past the coast—still on one engine.

And there once was a time when people believed the B-26 could not fly on a single engine.

The Marauders raiding Western Europe have had just enough encounters with FW-190s and ME-109s to keep their twelve .50 caliber guns from getting rusty. The few enemy fighters that have slipped through the Spitfire screen have been given a hot reception. Claims against them over a two-month period are ten destroyed, four probables and eleven damaged.

Out of the extremely low loss record of the Marauders and the gradually apparent results of their precision bombing against Nazi airdromes, there has grown in the combat crews a spirit of quiet confidence in themselves and in the ability of their bombers to deliver the goods.

"I wouldn't want to take one home to use after the war as a family airplane," they admit. "But when it comes to combat, I'll take a Marauder every time. It's a hell of a fine fighting airplane." ☆

The B-26s below have blasted fuel dumps, barracks and aircraft shelters at the Merville airdrome, large German fighter base in Western France. Railroad marshalling yards (right) at Serqueux, France, are pounded by bombs dropped by B-26s.

WINGS FOR THE WOUNDED

By Lieut. Col. Richard L. Meiling
OFFICE OF THE AIR SURGEON

THE war had fallen on this Sicilian countryside like a sudden summer rain, then passed on until the battle seemed muted and far away. There was only the throb of a blunt, growing pain for the young American fighter pilot as he lay in a narrow ditch alongside a roadway.

As his mind cleared, the pilot's thoughts raced through the events which led up to his present plight—the enemy shell which had exploded his oxygen system and forced him to bail out, his parachute descent, the tricky wind current that threw him off balance just as he reached the ground, and the violent bump he felt as his leg buckled under him.

His leg was broken and the jagged bone had burst through the flesh. As he struggled to pull himself from the ditch, litter bearers of a medical unit arrived. The two enlisted men lifted him carefully to level ground, stopped the flow of blood and carried him a few hundred yards to a jeep.

Within an hour, the jeep had taken him to an advanced Army Air Forces base where he was placed aboard a C-47 of the Troop Carrier Command which had landed not long before with ammunition and supplies. With its crew had come a flight nurse and a Medical Corps sergeant to attend the evacuees on the return trip.

Other casualties of Sicily joined the wounded airman and, when the transport had taken on its load of patients, they took off for the African mainland. As the C-47 landed at a North African airdrome, a line of ambulances trailed out on the field and took the casualties aboard to move them to a base hospital.

After the injured pilot had undergone treatment for a week, hospital authorities decided he should be removed to the States. With a flight nurse in attendance, the airman and several other patients were flown in a C-54 to Miami and taken immediately to AAF Regional Station Hospital No. 1 at Coral Gables.

The fighter pilot smiled from his hospital bed as he recalled the days he had spent aboard an ocean transport getting to the theatre of operations and the forty-five hours it took to bring him home to the finest medical care.

The case of this American soldier is not unusual. Almost every day patients arrive in the United States aboard the planes of the Air Transport Command from all parts of the world where our soldiers are fighting. It is a gratifying sight to see these four-engine transports set down at a United States airbase and unload patients who had been evacuated from India and China less than eight days before, and to know they will receive at once the highly specialized medical care that is possible in a modern hospital. It is heartening assurance to any man in the armed service to know that should he become a casualty he can be brought home in a seven or eight-day air voyage rather than experience two months of tiring passage in an ocean convoy.

Maj. Gen. David N. W. Grant, The Air Surgeon, has directed the development of the service which the Army Air Forces have used since Pearl Harbor to evacuate more than 100,000 casualties in every theatre of operations and along every route of the Air Transport Command. Through the air evacuation serv-

The growth of our Air Evacuation Service which has moved more than 100,000 battle casualties since Pearl Harbor.

ice, built by General Grant's organization, the lives of many fighting men have been saved. In the Mediterranean theatre alone, as of October 1, more than 25,000 casualties had been flown to base hospitals from the battlefields of Tunisia, Sicily and Italy without accident and with only one death enroute—a tribute to the Troop Carrier Command pilots and crews.

CONSIDER very briefly the military logistics as they are influenced by the use of an organized air evacuation service. It has been estimated that it takes eight and a half tons of supplies initially to maintain one man overseas for the first thirty days, and one and a half tons each month thereafter. The personnel of a 750-bed hospital number 539. Add to this the 750 patients, and multiply the above figures in tons per month, and you can see why the staff officers worry about logistics on the non-effectives. Consider, too, the problem that confronts staff officers in the actual fighting zones. There the roads are limited in number and capacity, and rail lines are either non-existent or consist of a single temporary track. Hospital trains and surface ambulances marked with the Geneva Red Cross can be used only to transport patients. The fuel, gasoline and oil required by these vehicles must be moved forward to their areas of operation, and since these single purpose vehicles invariably move in the opposite direction to the flow of traffic within the fighting zone, traffic is snarled and the roads and railroad sidings become congested. Air evacuation is the answer to the worried staff officer's prayer. Using the same camouflaged planes that bring troops, supplies and equipment forward (and which, were it not for evacuation, would return empty), and employing cover of a fighter escort when necessary, casualties can be flown hundreds of miles to the rear of the fighting zone. In this manner, hospitals to which patients are evacuated present a minimum of supply and traffic problems to combat commanders.

The more patients who require prolonged hospitalization or rehabilitation that are flown back to the States, the fewer medical facilities are needed and the smaller is the number of ship-tons of supplies required in the theatres of operations to support these non-effectives.

In Africa, Alaska, New Guinea and Sicily, AAF transport planes have been called upon to move entire field hospitals hundreds of miles. In one instance, ten planes were used, and in another forty planes. The remarkable part of this movement is that the hospitals were able to receive patients in their new locations on the day they were flown forward.

In May, 1942, the first airplane ambulance battalion was organized at Fort Benning, Ga., and on Oct. 6, 1942, it was transferred to Bowman Field, Ky., and redesignated as an Air Evacuation Group. The following month further reorganization was effected and the Medical Air Evacuation Transport Squadrons made their debut. On Christmas Day, 1942, the first of these squadrons left Bowman Field for the North African front, were soon followed by other squadrons into the other battle zones, and today they are serving wherever American troops are fighting and along the ATC's world routes.

A brief explanation of the operation methods of these Medical Air Evacuation Transport Squadrons is required to portray the extensive job they are doing. The headquarters and headquarters section has one flight surgeon (the commanding officer), one flight nurse (the chief nurse) and one administrative officer (supply, motor and mess officer), and 32

enlisted men who are clerks, cooks and drivers. There are four flights, each commanded by a flight surgeon, and composed, in addition to the commanding officer, of six nurses, six surgical technicians and two clerks. Each flight is divided into six evacuation teams, and each team is composed of one flight nurse and one staff sergeant.

OPERATING with flexibility to meet the immediate problem, the usual method of air evacuation within a fighting zone is to send the commanding officer (flight surgeon) of one flight forward to the airfield from which patients are to be evacuated. There he coordinates with the ground medical installations to learn the number of patients requiring evacuation, maintaining at all times liaison with the flight operations officer of the airfield. In this way he is able to arrange for patients to arrive at the airfield at the time the evacuating plane is available for movement. It is highly desirable that the patients do not arrive at the airfield before the plane is ready to take on patients. The actual loading of casualties is accomplished by the air evacuation medical personnel in a matter of minutes. The same coordination is accomplished at the airbase in the rear areas, the ambulances being ready to move the patients to hospital immediately upon arrival of the plane.

Aboard these cargo or transport planes of the AAF, litter-supports are available. Frequently they consist of metal racks, in which case, the C-47, for example, can carry eighteen patients. On other occasions, parachute webbing straps are used, in which event the same C-47 can carry 24 litter patients. Naturally, it is not desirable always to carry only litter cases; hence it is possible to mix litter and sitting or walking cases by using the "bucket seats" used by paratroops and other airborne troops on flights to the forward areas.

The evacuation team (one flight nurse and one staff sergeant) is aboard the plane flying supplies, materiel, equipment and personnel to the forward areas. They convert the ship to receive patients, and supervise their loading. When circumstances require it, they actually load the patients. The flight surgeon at the forward airbase keeps a complete record of all patients being evacuated, and the flight nurse aboard the plane makes a complete record for each patient, including the diagnosis, time in the air, altitude at which flown and the treatment required. Each evacuation team has available aboard the plane a "Chest, Airplane, Ambulance." This is a medical chest containing necessary equipment such as heating pads, bedpans, syringes, as well as the medicaments, blood plasma and food required enroute. In some cases the flight surgeon may accompany the flight, while in others the flight nurse may be alone on one plane and the staff sergeant alone on another. This occurs only when the number of patients to be evacuated necessitates the separation.

Abaard a flying ambulance in the Sauth Pacific, a flight surgean and a flight nurse administer a blaad transfusian ta a waunded soldier being evacuated.

Personnel of the Medical Air Evacuation Transport Squadrons are carefully selected for their training in the AAF School of Air Evacuation at Bowman Field. It is truly a case of "many are called, but few are chosen." The applicant must pass the physical examination required of all flying personnel, and he must be recommended by the senior flight surgeon as being particularly adapted for air evacuation work. From this select group, an exceedingly small number enters the school every two months. Upon arrival at Bowman, they again are carefully examined by flight surgeons. The course of instruction for flight surgeons, flight nurses and staff sergeants is difficult and strenuous. It includes particular phases of aerial medicine, aeronautics, tropical medicine, intravenous therapy, field sanitation, field service, compass, map and aerial photography orientation, defense against air and gas attacks and many other military and medical subjects. Graduates are assigned either to a newly activated Air Evacuation Medical Transport Squadron or to an AAF hospital for duty while awaiting activation of a new unit or assignment as replacement for personnel already serving overseas with air evacuation units.

In New Guinea, air evacuation began in August, 1942, and during the first 72 days of this service, more than 13,000 patients were flown across the Owen Stanley mountains. During last December alone, more than 7,000 patients were evacuated in New Guinea. A considerable number were flown to Australia. In the New Caledonia-Guadalcanal area, Army Air Forces, Navy and Marine Corps transport planes worked under a single command. Here evacuation of casualties began on September 3, 1942 and more than 17,000 patients have been flown out. In the North African Tunisian campaign which terminated May 23, 1943, the AAF evacuated more than 18,000 American, British, French and prisoners of war. During the Sicilian campaign, the Northwest African Air Forces (American and British) evacuated more than 14,000 patients by air. The 11th Air Force in the Alaskan area has evacuated over 1,000 patients by air this year. In the Libyan campaign, the 9th Air Force, supporting the British Eighth Army, evacuated by air more than 3,000 casualties during November and December of 1942. In the China-Burma-India theatre, our fighting forces are dependent upon air evacuation entirely. The transportation problem—

A battle casualty in New Guinea is placed aboard a plane which a few minutes before had unloaded equipment and supplies at a forward airbase.

the lack of roads and railroads—has made it inevitable that air evacuation play an important role in providing the high type of medical service that the American soldier deserves.

Yet, despite these accomplishments, early work in the field of air evacuation was not unopposed. Many staff studies, suggesting that air ambulances were impractical in war zones, pointed definitely to the medical dangers to be encountered in the transportation of patients by air.

Prior to 1940, in both American medical journals and those of foreign countries, many articles appeared concerning the types of patients that might be flown and the types that should not be flown under any circumstances. Experience has shown, however, that a detailed understanding of the physiology of flight and of aviation medicine as a whole is far more valuable than all the theoretical articles previously prepared. Medical personnel who have received adequate instruction in the care of patients while in flight have enabled the Army Air Forces to fly all types of patients without endangering their lives to the degree that travel by surface craft might have done.

The German Luftwaffe, in its "dress rehearsal" for World War II, held under the guise of aid to the Franco supporters in the Spanish civil war, evacuated casualties of the German Condor Legion by air over the Alps to German university and military hospitals. These flights of 1,500 miles were accomplished in ten to twelve hours, as compared to the many days required by boat. The patients were taken to altitudes ranging from 15,000 to 19,000 feet, thus making medical history in that for the first time records of actual transportation of battle casualties at such altitudes were available.

In September, 1939, the Luftwaffe, supporting the blitzkrieg as it rolled through Poland, evacuated approximately 2,500 patients from the Polish battlefields to the hospitals of Germany. According to German press reports of August 9, 1941, some 280,000 casualties had been evacuated by air from the eastern front in the Balkans and Russia.

Few details are known as to the operation of air evacuation by our Russian allies. It is reasonable to assume, however, that they use air evacuation extensively, because of the vast distances involved in their battle lines. The British, Canadians, Australians, and French in most instances have used air evacuation facilities provided by the combined Allied Air Forces in the theatres of operations.

DURING the first World War, both the Allies and the Central Powers used combat planes to transport wounded personnel. At best, these were far from satisfactory since the patient was of necessity wedged into the narrow cockpit of the open planes. However, in France a young physician—a Dr. Chassning—who was likewise a great aviation enthusiast, invented what is thought to have been the first airplane ambulance. In 1917, Dr. Chassning, who represented the District of Puy-de-Dome in the French Chamber of Deputies, made his plea before that legislative body for an appropriation of funds to finance the development of his airplane ambulance. His plea was met with prompt and cruel criticism, one opponent demanding to know: "Are there not enough dead in France today without killing the wounded in airplanes?" But Dr. Chassning was persevering, and by the fall of 1917 he had secured the necessary funds and built his first military airplane ambulance. In the first flight at Villa Coublay in September, 1917, the doctor served as the first patient. His plane was used later on the Amiens front.

A few months later in the United States Maj. Wilson E. Driver, a reserve medical officer assigned to the Army Air Corps, enlisted the aid of Capt. William C. Ocker of the Air Corps, and they developed what is now recognized as the first American ambulance plane. It was plane No. 3131, placed in service at Gerstner Field, Lake Charles, La., in February, 1918. The rear cockpit of this plane—a converted *(Continued on Page 53)*

At an advanced base in North Africa, Medical Corps personnel prepare to remove wounded from an ambulance to a transport plane which will take them to well-equipped hospitals hundreds of miles from the battle front.

PREPARE FOR INSPECTION

ADMINISTRATIVE • COMMUNICATION • TACTICAL • TECHNICAL

TIMELY ADVICE FROM THE AIR INSPECTOR

Matters presented here are informative only, and are not to be considered as directives.

TIPS FOR THE UNIT REPRESENTATIVE AT A PORT: If you are ever assigned as a Port of Embarkation representative of an organization going overseas, the information below should be helpful to you. These tips were picked up by POM members of the San Francisco field office of The Air Inspector on a visit to a port:

Have several copies of shortage lists to avoid scurrying around for a typist to turn out additional ones.

Bring along a portable typewriter if possible.

Check with the various supply agencies at the port, even though the shortage lists are negative.

Be sure you understand everything in the movement order.

Don't forget to find out from your organization commander in what priority he desires to load his special and general purpose vehicles and organizational equipment, so that they will be in proper order for unloading at the debarkation point.

Keep in touch with your organization commander and inform him of any changes or deviations from planned procedure.

Don't forget to look at the port bulletin board for instructions, and check the message center frequently.

Keep informed on the status of your unit's property.

Be sure that when initial shortage lists are submitted, an entry is made thereon which will clearly cancel any previous requisitions.

Remember that the following medical supplies are automatic issue: sulfa drugs, foot powder, adhesive tape and first aid kits.

Remember, too, that cleaning and preserving materials for individual weapons during the voyage are a matter of issue by the ordnance supply agency at the port.

FAREWELL TO ARMS — UNNECESSARILY SORE: Unnecessary "repeat performances" of immunizations should become a thing of the past through careful adherence to the provisions of AAF Memo. 35-2.

This memorandum directs that an original and duplicate copy of the Immunization Register will be made in all cases. Whenever an immunization roster is furnished by a station hospital to an organization, original copies of Form 81 for individuals immunized will be attached. Immunization data will be recorded immediately in the Service Record upon receipt of the original copies of Form 81, and these copies will then be attached to the Forms 28 (Individual Pay Records) of the enlisted men.

If the original copy of the Form 81 is lost, a true copy, signed by a commissioned officer, will be furnished the enlisted man. Information will be obtained from the Service Record or from the copy retained by the station hospital.

In case a soldier becomes separated from his Service Record, his organization commander will accept the evidence of the original immunization register in the possession of the man, pending the receipt of his Service Record.

TELL THEM MEN ARE COMING: Unexpected guests can be just as disturbing in the Army as in civilian life. It is not intended that enlisted men should arrive at a station with no provision made for food and quarters. Commanding officers and transportation officers are reminded of the provisions of WD Cir. 102, 1943, Par. 3b (1):

"The station commander (transportation officer) at the point of origin of each movement will inform the station commander (transportation officer) at destination by telephone or telegraph (not radio) of the unit designation, strength, date of departure, and expected date and hour of arrival of each element. This notification will be given for all movements of units and detachments and will be made in sufficient time to permit proper arrangements to be made at new station for the reception of the troops."

REALISM IN FIRST AID TRAINING: Making first aid training as realistic as possible is a problem for instructors in this country. It is no problem overseas, as the men's interest increases in proportion to their nearness to combat. When a gunner is taken from a bomber with a bullet in his arm, and the medical officer says his life was probably saved because a crew member applied a simple tourniquet promptly, every man on the station is convinced of the value of first aid training.

You can't shoot a man in the training phases to demonstrate the practicability of first aid, but you can produce some "reasonable facsimiles" of the real thing. Some bases have staged sham battles as part of the first aid classes, and the realism obtained in caring for the "wounded" was most effective.

RATIONS ON TROOP TRAINS: Base administrative inspectors can be of real service to officers appointed as train commanders, quartermasters or mess officers in the movement of troops by rail. Inspectors should contact the train officers, especially if they are inexperienced junior officers, and go over WD Cir. 100, 1943, with them. No officer should be in charge of troops on a train unless he thoroughly understands the use of rations and ration funds. (AAF Memo. 67-17)

FROM THE MEN WHO KNOW: Draw up a chair, crew members, for those "bull sessions" with colleagues returned from overseas. Tactical inspectors are urging

trainees to listen carefully when combat veterans start relating their experiences. Reports from overseas reveal that many bombers have shaken off all the flak the enemy could turn loose because of pointers the crew members picked up by listening to men who had been in action before them.

Life Raft Hazards: "There's a life raft out in my north pasture. It came floating down from the sky and darn near scared my cows to death."

The South Dakota farmer telephoning this information to an airbase was reporting something which you technical inspectors in the field should strive to prevent by spot-checking bomber life raft compartments.

Packing too much equipment in the compartments or placing wrong size rafts in them may cause the spring locks to give way from strain. The resultant damage may be much more serious than a few frightened cows. The dropping of the rafts into the air stream is liable to cause a smashed tail surface and a fatal crash.

'Bury' Your Helmet Liner: Just imagine, soldier, that your helmet liner is the last one you will get for the duration and take care of it accordingly. As a matter of fact, you may find yourself in a spot overseas where it is impossible to get another liner, and uneasy will lie the head that wears a cracked one.

Particular care should be taken in stowing the liner in your barracks bag. Ordinarily, in troop movements the liner is worn, but if it isn't, be sure to surround it with clothing. (WD AGO Memo. W600-71-43)

Check Spare Part Specification: Crew chiefs, carefully compare the specification number of a new part with the number of the part it is to replace in a plane. There may be trouble in the sky if you don't.

The fuel line is an example of the many items the specification numbers of which should be checked. The wrong line may not be strong enough to withstand a strain of high altitude and may collapse, causing fuel stoppage.

Cracks in Turret Domes: Reports from combat theatres indicate that under the rigors of extreme heat turret domes of plastic construction may develop cracks. These cracks, due to expansion and contraction, usually are first noticeable around the base of the dome. Frequent inspections should be made to discover these cracks and renew the dome before the cracks become large. If cracks are neglected, buffeting of the wind will finally cause a complete dome failure, and, when the dome rips off the turret, severe injury may be caused to the turret gunner.

☆ INSPECTING—THE INSPECTOR

Are you delaying thorough inspections of organizations until they are alerted? They need this help on details throughout their entire training period.

☆ ☆ ☆

Are you checking to see that additional items are entered on Form 20 (Soldier's Qualification Card) as prescribed in Par. 3, AAF Reg. 15-126, 2 August 1943?

☆ ☆ ☆

Are you following through on inspections of organization sets of regulations and directives to be sure that requisitions are submitted for needed publications?

☆ ☆ ☆

Are you checking to see if the "Spartan simplicity" policy is being followed in post construction? Only the most urgently needed painting and repainting will be permitted. (WD AGO Memo. W345-23-43, 24 August 1943)

☆ ☆ ☆

Have you inspected bulletin boards recently to be sure they are not cluttered up with obsolete matter?

Lights Out: Burning midnight oil is all right at midnight, if necessary, but it is certainly not necessary at high noon. Administrative inspectors should make frequent checks to see that lights are not left burning needlessly during the day. Doorway lights of barracks and other buildings especially should be checked. ☆

☆ HERE ARE THE ANSWERS

Q. Where do you obtain Standard Form 1055, used in claiming arrears of pay for deceased personnel?

A. This form will be furnished the proper claimants by the Finance Officer, U. S. Army, Washington 25, D. C. (Ch. 1, AR 600-550)

Q. May liaison pilots fly planes of more than 180 horsepower?

A. Yes. Liaison pilots are now restricted to liaison type aircraft of 190 horsepower, instead of 180. (AAF Reg. 35-27, 17 August 1943)

☆ ☆ ☆

Q. Is information as to name and address of emergency addressee still required on identification tags?

A. No. (Ch. 25, AR 600-35) No effort should be made, however, to revise identification tags now in the hands of individuals.

☆ ☆ ☆

Q. How often must military personnel be revaccinated for typhoid fever and paratyphoid fevers?

A. Annually. (Ch. 6, AR 40-210)

☆ ☆ ☆

Q. If movement orders for overseas specify yellow fever vaccination, should the vaccination be delayed until arrival of individuals at the staging area or port of embarkation?

A. No. Such vaccination will be accomplished at the station of final phase training immediately upon receipt of movement orders. (Letter, Hdqts. AAF, 10 September 1943, AAF 062.2)

☆ ☆ ☆

Q. If trunk lockers are not available for officers going overseas, may box lockers be requisitioned as substitutes?

A. Yes. (WD Cir. 196, 1943)

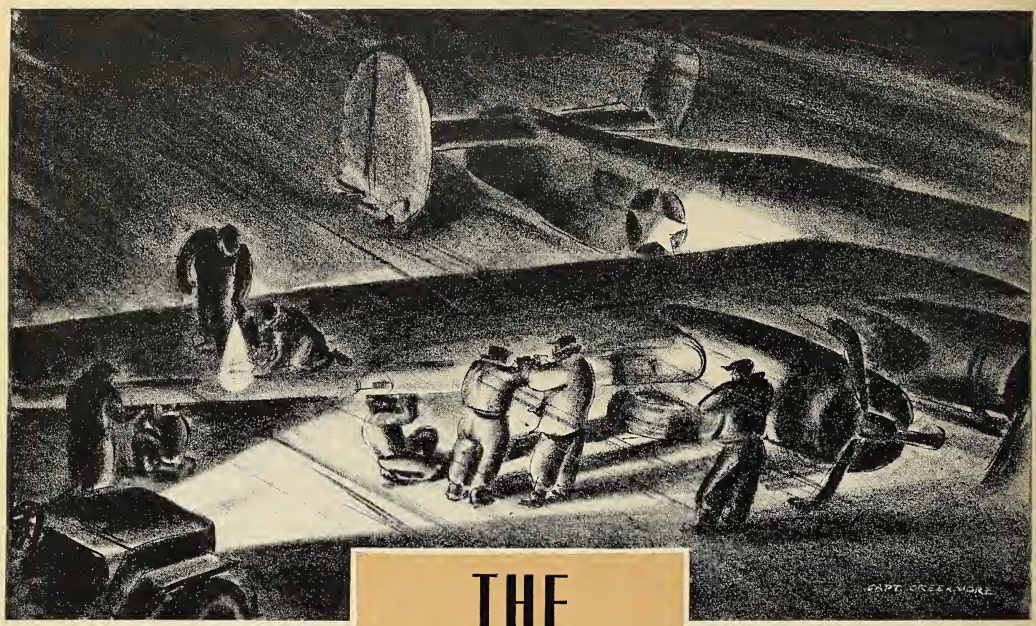
☆ ☆ ☆

Q. If a disbursing officer fails to take advantage of discounts for the payment of bills within a certain time, must he justify his failure?

A. No. He will take advantage of all discount features, if possible, but there is no obligation upon him to justify failure or to obtain waivers for failure to take advantage of discounts in those cases where payment is made after the expiration of the discount period. (Ch. 1, AR 35-6200)

Q. When is a per diem allowance authorized instead of a mileage allowance for travel?

A. Per diem is authorized in connection with travel only when it is considered that the length of temporary duty may result in expenses that will exceed the reimbursement on a mileage basis and thus cause the traveler to suffer a loss. In all other cases payment of a mileage allowance is the normal form of reimbursement for ordinary travel in a mileage status. (Ch. 1, AR 35-4820)



THE RAMBLING WRECK

Illustrated by CAPT. RAYMOND CREEKMORE

THEY thought "Jap Picnic" was through with flying that afternoon in September, 1942, when she was reduced to a mass of tangled wreckage in a taxiing collision on bleak Aggatu Island in the Aleutians. But with that wreck began the most interesting chapter in the career of the battle-scarred B-24.

An engineering officer, Capt. Doug Symington, put Jap Picnic back in the air, piece by piece. Here's how it was done:

Two months after the field collision, a bomber limped into Aggatu from a mission over Kiska with the leading edge of a main wing spar shot up and a de-icer boot badly damaged. There were no parts in stock so Master Sgt. R. M. Brosius, line chief, put his men to work on the carcass of Jap Picnic. With eight men, including Gilbert Hansen, civilian representative of Consolidated Aircraft, they braved a 35-knot gale through an entire night removing hundreds of little screws to dismantle the damaged spar, boot and de-icer from the damaged plane and from the "wreck." They then fitted the specialized bones of old Jap Picnic into the wounded bomber. They worked by the uncertain rays of flash lights and jeep headlights without any shelter from the storm.

Only two fragile 3/16th drills were between the crew and failure and one of them shattered as the second hole was drilled. The remaining drill had to last and did. After each drilling it was resharpened on a hand grinder clamped to the fender of a jeep. The tedious job required ten hours and at 0500 she was ready to fly a combat mission.

Two weeks later another B-24 returned from a Kiska mission with one prop feathered and an engine frozen stiff. Replacements were not in stock. The ground crew pounced on the remains of old Jap Picnic, wrestled an engine from its nacelle and substituted it in the crippled plane. This job was done in less than 19 hours through a 45-knot gale that whipped sleet and snow about in below-freezing temperature. Tarpaulins partially protected the men from the sleet that bit like steel. Crew chief stands and workmen were hurled to the ground by the frigid blasts; the plane was lashed to a tractor and a jeep to hold it on the ground. With tools meant for second echelon maintenance, the crew completed the job in time for ship No. 1816 to fly a combat mission the next afternoon. Another hunk of Jap Picnic was in the air again.

Ship No. 1091 came in with all the wires from the bombardier's compartment to the bomb rack burned out—more than 100 wires servicing 20 stations. The ground crew snipped the wires from Jap Picnic's insides and spliced them end to end in the nerveless ship. There were 150 wires and each had two

joints to be soldered, taped and shellacked. Only one man at a time could carry on the job because of the shortage of tools and the cramped quarters. Lying on his back, he would work with his arms outstretched until his muscles became cramped. Then another man would take his place.

It took fifteen hours of this exhausting work before 1091 was back in service, but she passed inspection for third echelon maintenance.

Old Jap Picnic someday will be bombing Tokyo. She can't miss for she has turrets, a nose section, her rudder, a wing tip, flaps, radio, ignition parts, a prop governor, trim tabs and other odds and ends in almost every heavy bomber flying for the 11th Air Force. And, to make sure that none of her parts are wasted, Maj. Robert Orth acquired her cockpit carpet for his quarters. Despite her loyal military service, she also had to serve as a privy for a time. A seat was wrenched out of her to make an open air toilet.

INVENTORS IN NORTH AFRICA

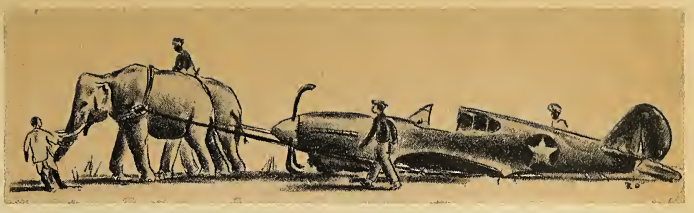
AMERICAN boys who made their jalopies run with bent nails and bailing wire have taken their resourcefulness with them to North Africa. A staff sergeant with the 12th Air Force has used salvaged parts to devise a testing board for almost every instrument on the B-17 control panel and has made a generator testing device from a gun turret mechanism. With odds and ends, he has built an inter-communication system for his camp in Africa. For the medics on the base, the mechs have made a sterilizer. As in most GI inventions, the basic parts came from that highly adaptable item — the 55-gallon drum.

A MAINTENANCE TIME-SAVER

STAFF SGT. ROBERT HAMMEL gets restless when he sees work being performed tediously by hand. A mechanic at an advanced depot of the 8th Air Force Service Command, he concluded that a lot of man hours were being wasted in polishing the booster coil points of a bomber engine. By fashioning a three-piece tool and fitting it to a drill press with an electric motor hook-up, he developed a first-class polisher that saves one hour and twenty minutes on each set of points.

THE MEN BEHIND THE GUNNERS

AT another 8th Air Force Service Command air depot, Staff Sgt. Russell Schlick helped the gunners in his outfit knock down an extra Jerry or two by developing an adjustable sight for long-range shooting. His invention, an adjustable ring and post sight for certain guns, now enables gunners to adjust their sights for almost any target distance within the effective range of their guns.



RECLAIMING A WRECKED P-40 FROM THE BURMA JUNGLE

A FEW days after Christmas in 1942, Lieut. Allen Whittington, engineering officer, received word that a P-40 had crashed on a river island 100 miles from his base in the Assam-Burma combat area. His job was to take his salvage crew to the jungle island, reclaim the plane, return it without further damage and rebuilt it in a minimum of time.

Lieutenant Whittington chose as his salvage crew Tech. Sgt. Herbert Kraling, Staff Sgt. Ronald McDonnell, Cpl. Hucle Truly, Cpl. Lewis Beezely, Cpl. Leo Park and Pvt. Thomas Cobb.

With ten-day rations and tools and equipment for dismantling the plane, the salvage crew piled into a DC-3 in the afternoon. The wreck was spotted from the air about fifty yards from the river bank. The pilot set the transport down in a nearby grass field and the salvage crew unloaded and prepared for action.

The P-40 pilot had escaped unhurt and had obtained two elephants to tug the wreck through the jungle to the river bank where it could be loaded on a barge. The day after reaching the island, Lieut. Alfred Wipf, fighter squadron engineering officer, Lieutenant Whittington and Sergeant Kraling negotiated a trail to the river's edge about thirty miles upstream. Without great difficulty, they were able to rent a rice barge from a native Indian for 300 rupees (about $100) with a bonus if he would hurry. The barge was nine feet wide and sixty feet long.

The native agreed to take his barge down-river to the spot near the wrecked plane, so Lieutenant Whittington returned to the camp of his salvage crew where plans were made for disassembling and transporting the P-40 to the barge on the river bank.

On the fifth day the salvage crew succeeded in getting all equipment to the plane where a tent was set up for quarters. Tail sections and engine were removed, and the engine was put on a shipping stand that had been brought along. A contract with the village chief produced a bamboo ramp from shore to boat.

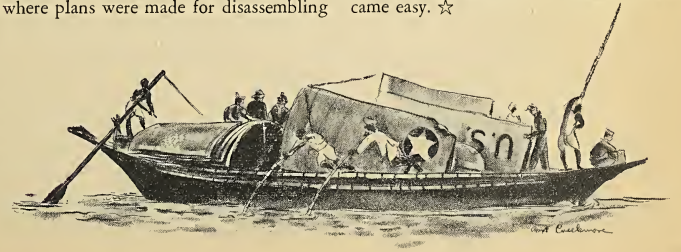
Two days later, after all plane parts and salvage equipment had been loaded, the crew broke camp and began poling the boat down the river.

On the tenth day the salvage party reached a point on the river where Lieutenant Whittington, who had returned to base to make further arrangements, was to meet them with trucks.

Lieutenant Whittington, meanwhile, had mapped a road from the base to the barge landing spot. This job required more than 200 miles of driving over jungle paths and wagon trails in a jeep to find a passable truck route. A trailer then was built from a truck chassis by Tech. Sgt. James Quinn, Staff Sgt. Theodore Dorn and Cpl. Harold Busch.

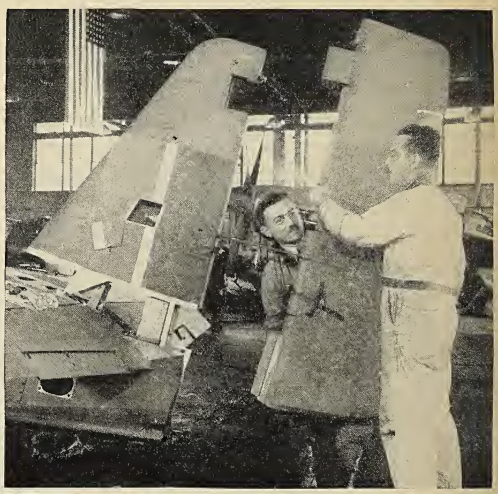
At 0100 the following day, the truck detail reached the barge detail. Dense fog hindered the loading but the job was accomplished. The P-40 arrived at the base on January 9, fourteen days after the plane had crashed and twelve days after orders had been received to reclaim it.

The salvage detail of the service squadron had travelled 100 miles by air, 150 by boat and more than 150 by truck. Rebuilding the plane for combat service came easy. ☆

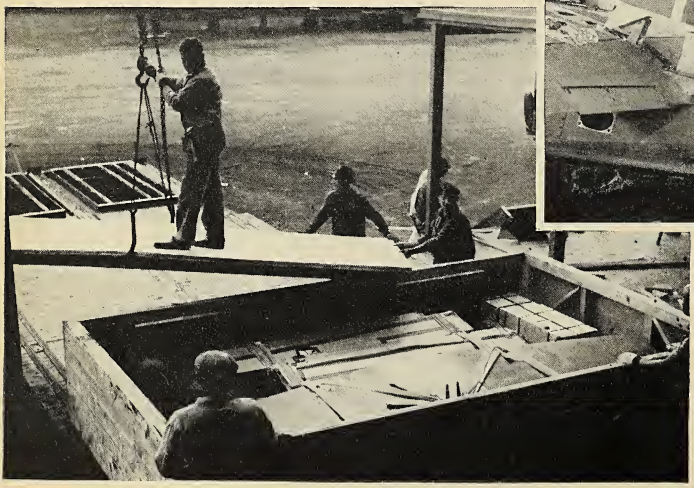


PRELUDE

Like the shodow ond shope of flights to come, these plones owoit ogoinst the clouds for shipment overseas. They have just arrived by "flyowoy delivery" from plants all over the nation. In these shokedown flights they have reveoled ony foults for correction before they fly ogoinst the enemy.



Accompanying each plane on the oceon crossing is its individuol pocking cose carrying the propeller, wing tips and other parts which may be reossembled overseos to place the plane in reodiness for combat.



From the "stoging oreo" the plones ore towed into hangors where dozens of workmen swarm over them to remove the propellers, toil assembly ond wing tips. Each seom is toped water tight. They tape every outlet ond vent, install dehydrotor plugs, droin the oil ond hood the engine with heavy torpoulin. Every conceivable thing is done to protect the plane from domoge on its ocean voyoge on the deck of o ship.

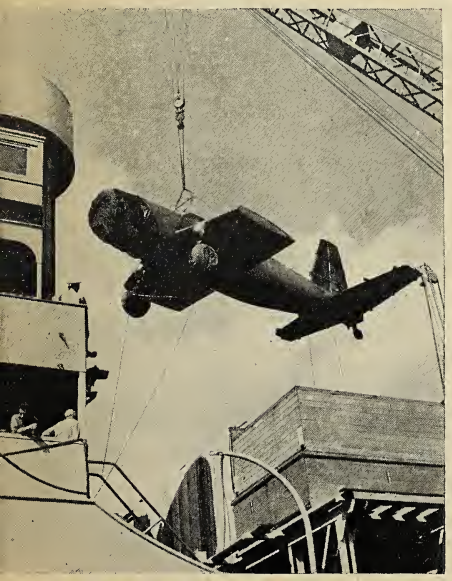
TO COMBAT

THE Atlantic Overseas Air Service Command has a goal of empty warehouses. Warplanes by the thousands are flown into the command area at Newark and prepared for delivery to our fighters overseas. Any disruption in this gigantic torrent of war materiel can cause the warehouses to bulge. It is the job of thousands of officers, enlisted men and civilian workers to expedite the flow of AAF and air lend-lease materiel through Atlantic and Gulf Coast ports to overseas theatres of operations. There is little glamour in crates and boxes, but they go to the men who win the medals. AOASC workers, one officer explained, are the embodiment of people who stand in reflected glory. "Our morale rides like a kite on the tail of a fighter plane," he said. ☆

Waiting like trussed birds, these planes are ready to be loaded on the decks of oil tankers, merchant vessels or warships. Almost everything that floats is used to carry a complement of fighter planes across the seas. The aircraft above are now completely taped and sprayed with an oil coating to protect them from salt water and spray.

Close-ordered as infantrymen, these P-47s stand on the deck of a small aircraft carrier to be taken to a theatre of operations. The Atlantic Overseas Air Service Command, the AAF's greatest shipping outlet, is keeping the warehouses empty.

The ocean voyage begins when the great hydraulic cranes lift the planes from the dockside and swing them to the deck of a ship. Each plane has its individual packing case carrying the disassembled parts.



PREPARE FOR DITCHING

The following summary of ditching procedures was prepared by the Office of Flying Safety in cooperation with Bombardment Department, AAF School of Applied Tactics. —THE EDITOR.

THE pilot and crew of a B-17 returning from a raid on Wilhelmshaven early last spring ditched their ship in the face of almost incredible odds.

The bomber dropped out of a formation over the English Channel shortly after leaving the continent. Two of its engines were shot out and a third was operating improperly. A pack of Focke-Wulfs pounced on the crippled plane for a kill, and as the pilot reported later:

"The situation looked completely hopeless."

With one good engine, the pilot managed to keep up an evasive action while his crew played a stream of lead into the attackers. The ship's tail, now almost chewed in two by enemy fire, started blazing. The right waist gunner succeeded in smothering the fire, only to have another crop up in No. 2 engine. The co-pilot managed to extinguish this one.

Between 7,000 and 8,000 feet, the pilot decided that ditching was inevitable, so he immediately issued the preparatory order.

All but two of the enemy fighters had been left behind. The Fortress was out of ammunition, except for the top turret guns. Realizing this, the remaining attackers came in deliberately for the kill. Crew members were now at their ditching posts in the radio compartment, so the co-pilot took over the top turret and waited patiently for the enemy fighters to close in. When the nose of the lead FW came into his sights, the co-pilot pressed the trigger and caught the enemy cold at 125 yards. The last attacker was dispatched by another B-17 which by then had come to the rescue.

The pilot made a perfect landing with only one engine.

The plane remained afloat for three minutes.

Less than thirty hours later, members of the crew were rescued from the rubber dinghies.

The pilot who was responsible for this outstanding example of ditching had stressed the necessity for correct rescue procedure and regular dinghy drills.

LANDING a big bomber in the ocean and transferring its crew into a rubber dinghy about the size of a mattress is not an attractive sport.

It's a complicated and dangerous job which taxes the skill and resourcefulness of each member of the crew, and which, if not successfully executed, may shorten the life expectancy of the bomber's personnel.

This illustration for a poster prepared by the Office of Flying Safety shows crew members abandoning their B-17 after a successful emergency landing at sea. The pilot is escaping through the left side window; the co-pilot, already out, is working back to the wing and his place in the right dinghy; the ball turret gunner, astride the fuselage, and the bombardier, just visible in the hatch, are the last to leave the radio compartment; the tail gunner is seated in the left dinghy holding a ration pack; the navigator is boarding the same raft while the radio operator holds the dinghy line; the left waist gunner is carrying a thermos jug across the wing; the flight engineer is sliding onto the right wing, and the right waist gunner is holding the right dinghy in place.

The chances of survival when forced down at sea are in direct ratio to the interest shown by the crew in "dry run" ditching drill.

The need for a correct guide to such drill became evident to the British shortly after the RAF began its attacks on the European continent. It was obvious that every effort must be made to save valuable crews forced down in the Channel and North Sea. Studies of various forced water landings were made, and from these certain procedures were established and advocated.

The arrival of America's 8th Air Force necessitated an even more concentrated program of education along this line, plus the installation of an air-sea rescue unit. The Office of Flying Safety, Winston-Salem, N. C., was requested to study the problem and prepare a series of five posters outlining methods of ditching the B-17, B-24, B-25, B-26 and A-20.

This agency, after exhaustive studies, has completed five graphic posters suggesting the procedure for an ocean landing.

The welfare of the crew after the landing also has been taken into consideration in an emergency booklet soon to be out which carries a section dealing with ocean survival. This booklet tells the crew what to do after the landing has been successfully executed and the plane abandoned.

To gain a thorough understanding of ditching, the subject should be approached in three phases: preparation, actual ditching and subsequent survival.

The age old axiom, "an ounce of prevention is worth a pound of cure," has been cuffed about considerably but it provides an excellent golden rule

Your chances of surviving an emergency landing at sea are enhanced by constant drill in proper procedure.

to be followed by every bomber crew.

Preparation for ditching should start before the plane leaves the ground.

Drill comes first and foremost in preparation and is the direct responsibility of the pilot. It should include the practice of each crew member's duties after the order "prepare for ditching" is given until the rescue plane or ship arrives.

When each man knows his duty well enough to perform it mechanically, and if need be in a darkened ship, his education can be considered at least partially complete.

The wise pilot will also see that inspection of all equipment before long overwater missions is a *must*. This calls for a thorough check of each piece of emergency equipment, not only to see that it is in the plane but to determine whether it functions properly. This check includes the CO_2 cartridges on life vests and rafts. Ration kits without food or water are good for little other than bailing, so a check to see that water containers are filled and food is in good condition might stave off hunger and thirst if a forced landing occurs.

Signaling equipment is the one link raft occupants have with civilization. Thus the importance of workable accessories such as an emergency radio, Very pistols, sea marker and signaling mirrors is obvious.

A jammed hatch can become very annoying when water is up to one's neck and escape is essential to continued breathing. By testing escape hatches before take-off, crew personnel may avoid any such embarrassments.

It's too late to check these items after the ditching order has been given.

Contrary to popular belief, the camel is not alone in his ability to store water. Recent life raft tests conducted in the Gulf of Mexico proved that the human body also can store water.

Thus it is important that each member of the crew drink as much as he comfortably can hold before departing on an overwater trip. If a forced landing at sea appears imminent while in flight, it's a good idea for the crew to fill up from water stores which cannot be taken aboard the raft. This applies to food also.

The Mae West of stage and screen may be a glamorous gal but the life vest of the same name is a more practical companion for a man if his plane has let him down. In fact it is the most important piece of ocean survival equipment he possesses and should be treated as such. To get best results, the wearer should don it upon receipt, inflate both sides and adjust leg and waist straps. Otherwise he may find himself tied in a knot the first time it is inflated, and the wing of a sinking plane offers few advantages of a dressing room.

The pilot's popularity with his crew may have suffered slightly during the weary hours of drill, but it will bounce back to a new high when the ditching actually occurs.

Assuming that he is the pilot of a B-17 which is being forced down over water, a glimpse of the inside of the Fortress during preparation, actual ditching and escape should show the procedure outlined in the posters prepared by the Office of Flying Safety.

It is evident that his plane will have difficulty in reaching shore so the pilot notifies the radio operator to transmit a distress call, giving position, course and speed of the plane. Correct drill has taught him that it's always safe to be prepared in advance. If ditching seems unnecessary later, the call may be quickly cancelled.

If fuel is low—say only five minutes' supply remains — the pilot immediately issues the order to "prepare for ditching." A power landing is important.

Drill has been worked out on the ground, so each member of the crew responds in the order practiced—"co-pilot ditching," "navigator ditching," and so on, until each man has acknowledged the order.

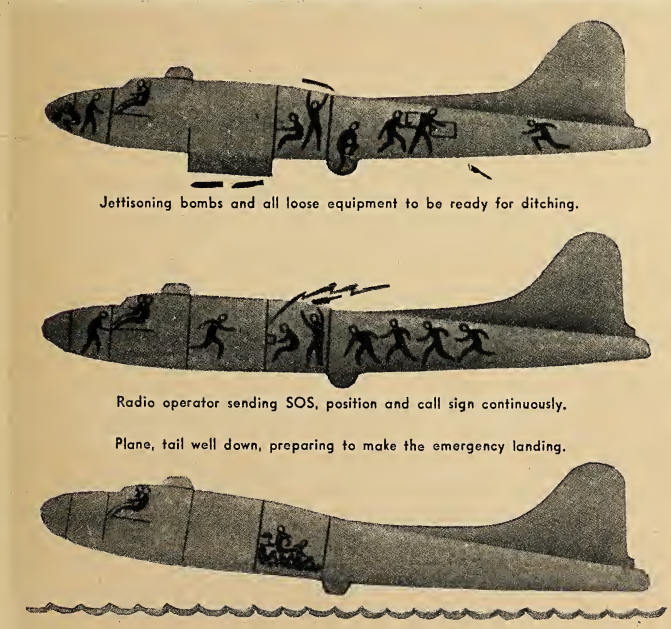
Crew members now loosen shirt collars and remove ties, lest they serve as a noose to strangle the luckless crewman. Unless the plane is at an altitude of over 12,000 feet, oxygen masks are removed. If over 12,000 feet, the main oxygen supply or emergency oxygen bottle is used until the pilot advises otherwise. Heavy flying boots are slipped off but clothing for the cold nights on the raft is worn.

The inside of the big bomber is a busy place now. Crew members are heaving out all loose equipment—guns, ammunition and anything that might serve as a lethal battering ram upon impact. Bombs and depth charges — if any — are jettisoned. If the plane is too low to permit this, they are placed on "safe." A rack full of live bombs is about as fragile as a sack of eggs but the effect upon impact is slightly more noticeable.

If the bombs have been successfully dumped, the bomb bay doors are closed to prevent an inrush of water upon landing. Landing gear is also up and all lower hatches are securely fastened after equipment has been jettisoned. Upper escape hatches on the other hand are jettisoned to facilitate a quick exit upon landing.

The navigator has found enough to keep him busy, since it's his duty to calculate position, speed and course.

Rescue units find it helpful to know the position of a plane forced down at sea, so the navigator passes this informa-



Jettisoning bombs and all loose equipment to be ready for ditching.

Radio operator sending SOS, position and call sign continuously.

Plane, tail well down, preparing to make the emergency landing.

tion on to the radio operator. The radio operator is plugging away at his set now, relaying all data handed him by the navigator and repeating it along with SOS calls.

The pilot has opened the window at his side and the co-pilot has helped fasten his shoulder harness as a guarantee that his face won't become part of the instrument panel upon impact with the water. The co-pilot has also opened the side window through which he is to escape and has pulled his seat well back, adjusting his own shoulder harness.

The pilot meantime has given the crew a running account of what's going on with repeated observations on the ship's altitude. Orders are not necessary because each man knows his job.

Members of the crew, having jettisoned equipment and closed hatches, are now proceeding to the radio compartment in much the same orderly manner that school children conduct a fire drill.

The navigator picks up maps and celestial equipment to carry into the life raft, and locates the emergency radio and signal set for later use.

The bombardier, after destroying the bombsight, goes to his position in the radio compartment, closing the forward door after him.

The flight engineer upon arrival jettisons the radio hatch or lowers the radio window and secures the emergency ration pack to his arm with an attached rope.

The ball turret gunner enters next, followed by the right waist gunner and left waist gunner, each carrying equipment for dinghy use which they have picked up aft in the fuselage.

The tail gunner follows with an emergency ration pack.

The radio operator remains at his post transmitting distress signals until the pilot orders him to take his ditching post.

All members of the crew are now in crash position in the radio compartment. Loose equipment has been jettisoned or thrown into the bomb bay. Both doors to the compartment are closed and equipment for use in the dinghies is firmly held.

Parachute pads, seat cushions and other padding are being used by crew members to take up the shock of impact, protecting their faces, heads and backs.

Five seconds before the impact, the pilot orders "brace for ditching" over the interphone or by pre-arranged signal. The radio operator, now in position, relays the order to other personnel in the compartment, having heard it over the interphone he is still wearing. The emergency radio key is clamped down so that signals are transmitted continuously until after the plane lands.

The crew now braces for the two impacts they have been taught to expect—the first a mild jolt when the tail strikes, the second a severe shock when the nose of the bomber ploughs into the waves.

All possible preparations have been completed and it's now up to the pilot to ditch the Fortress.

The crew may be thinking about the girl back home at this point, but the pilot is busier than a bootlegger at a traveling salesmen's convention. The sea below him is a tricky landing strip and he's probably trying to recall a few tips he learned during the ground drill.

Old sailors are familiar with the term "seaman's eye," which literally is the art of interpreting the sea. The pilot may not have developed "seaman's eye" but he recalls a few things that may help him set his lumbering bomber down.

Waves, for instance, move downwind in open sea and the spray from them tell him which way the wind is blowing, a much more reliable method than wetting a finger and holding it up. If there are no waves, he notes the wind lanes—nothing more or less than a series of lines or lanes of alternate strips of light and shade on the water. These also indicate wind direction.

To determine wind speed, he remembers a little table he studied:

A few white crests indicate 10 to 20 mph wind; many white crests 20 to 30 mph; foam streaks 30 to 40 wind velocity, and spray from crests indicates a wind speed of 40 to 50 mph.

If the sea is glassy—and it's most difficult to determine altitude under such conditions—the pilot may allow the trailing antenna to judge for him. When this antenna strikes the water, the radio operator will get the signal and pass it to the pilot.

Under this condition, the pilot approaches the sea with power on, flaps down, tail well down. If waves exist, he approaches into the wind at right angles to them. In case of swells, he knows that the plane should be landed along the top and parallel to the swell, provided the wind does not exceed ten miles per hour.

If the ditching takes place at night, landing lights may be turned on, provided the reflection does not confuse the pilot's vision. Bright lamps within the plane are turned off, but may be snapped on after landing to illuminate the scene and guide possible rescue parties which might be nearby.

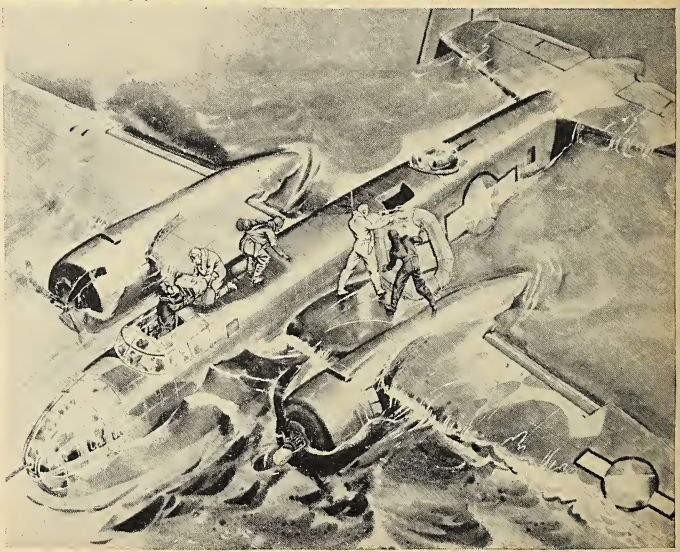
Life jackets have been worn throughout the ditching. They should not be inflated until exit has been made. Otherwise they may be punctured or may prevent passage through the hatch.

Each man holds his position until the plane has come to rest. Now the ball turret gunner pulls both dinghy releases. This automatically inflates the stored life rafts, which pop out onto the wing. Personnel exit in the orderly manner practiced, each carrying a designated piece of equipment.

The order in which they exit and go to dinghies follows this pattern:

Pilot through side window to left dinghy, co-pilot through right window to right dinghy, tail gunner first from radio hatch to left dinghy, navigator next to left dinghy, then the right waist gunner to right dinghy, flight engineer to right dinghy, radio operator and left waist gunner to left dinghy and ball turret gunner and bombardier to right dinghy.

Another OFS poster illustration shows a B-25 forced down on a choppy sea. Two members of the crew launch a dinghy while the others see that emergency equipment is carried from the plane.



The rafts are attached to the plane by a line but members of the crew take precautions now to prevent launching the raft where it may be punctured by any jagged plane edges. Care is also taken that it is launched and inflated right side up.

It may be quite proper to jump into a fireman's net from a burning building but it is extremely hazardous to jump into a rubber life raft.

Some of the equipment needed will already be stored in the raft; the remainder which has been brought from the plane must be hauled aboard and securely fastened. A quick check is made immediately to insure the presence of all necessary items—ration kits, emergency radio and signaling equipment. Parachutes will be carried along by wise personnel since they can be used for sails, cover and protection against the sun.

Both rafts have cast off from the plane and are tied together. If the plane is still afloat, the crew knows it's a good idea to stick around. A raft is hard to spot on the ocean, but the plane's outline can be readily seen from the air.

The plane has been successfully ditched, personnel are in the dinghies and in all probability the nearest land is several miles down. Where to? is the next logical question.

There are no handy road signs—that's a cinch—and waves have a monotonous uniformity which doesn't identify one's whereabouts. Therefore, it's up to the navigator to furnish an estimated position either from calculations made aboard the ship or if at night by celestial navigation.

When all this has been decided, it's wise to lay out a course to some definite objective and then try to stick to it. There are three important aids to survival which won't be found in the emergency kits—determination to get ashore, calmness and common sense. Raft occupants should keep their shirts on — figuratively and literally.

Clothing not only protects the wearer from cold at night but staves off serious sunburn caused by direct and reflected rays of the sun. Protection from the sun is particularly important in the tropics. The tropical sun not only results in severe sunburn for the unprotected but increases thirst. The tarpaulin in which rations were wrapped or a sail may be rigged, yellow side up, as a canopy or sun shade. The yellow side is spotted more readily from a plane.

Having no knowledge of when land will be reached or a rescue effected, the pilot takes stock of food and water and plans a course of rationing to cover as much time as possible. Neither food nor water is allowed for the first 24 hours.

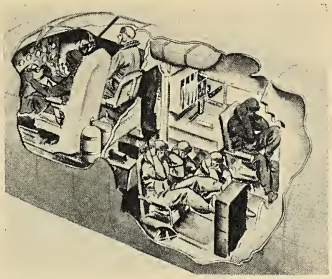
A man in good physical condition can live for twenty or thirty days without food. Without water, he can survive only about a week and a half at the most. With little water on hand, food should be eaten sparingly since it increases thirst. Water best serves as a thirst quencher when held in the mouth, swished about the tongue and gargled. Salt water as a beverage is taboo but as a cooling bath it may have possibilities, provided the hygienic raftsman keeps the water out of his mouth.

Gum-chewing relieves mouth dryness; smoking causes it.

In the event of rain, the tarpaulin or sail can serve as a rain catcher after the salt crust has been washed away. As much water as possible should be drunk, the rest stored in containers.

With sufficient water, food now poses a problem. The fishing kit provided in all rafts may not be Isaak Walton's idea of a complete set, but has proven that it will catch fish.

It is necessary to eat the fish raw but, strangely enough, raw fish is neither salty nor unpleasant to the taste if cleaned upon catching and washed free of blood.



B-17 crew members are shown in crash positions they take just before the plane strikes the water. These positions, maintained until the plane comes to rest, reduce the possibility of injury.

The liver and entrails may be used for bait.

Shark should be eaten only when water supply is adequate. This applies also to skates, rays, seaweed and crabs. Jellyfish, sea snakes, parrot fish and puffer fish are poisonous to humans. However, most fish found in mid-ocean are safe to eat.

Raft health has nothing to do with the condition of the rubber dinghy, although frequent checks of the craft are advisable. Raft health has to do with the physical condition of its occupants, which may fall below the Army doctors' standards if they've been in the raft for many days.

A raft ailment that can become serious unless proper precautions are taken is a condition known as "immersion foot." The extremity referred to becomes swollen and numb, and breaks out in sores if continually exposed to cold sea water in the necessarily cramped confines of the raft. If allowed to continue, serious infection may result. The best antidote is dry feet.

Similar exposure may cause salt water boils or burns. An application of sulfanilamide ointment and bandaging is helpful. Squeezing or pricking is dangerous.

Aside from water, signaling equipment may be classed as the most important equipment (with the exception of the raft and life vest, of course). Without signaling equipment rescue is a mere chance.

The emergency radio set, which is provided with a hydrogen balloon and kite to raise the antenna, should be used constantly.

Very pistol and cartridges, signaling mirror and sea marker, if easily accessible, can be used on instant notice. Only a few minutes will elapse between the time a rescue plane is sighted and the time it disappears over the horizon. The Very pistol if fired before the plane is overhead can be seen from the pilot's compartment. If the plane is directly overhead, there is little likelihood that the pilot will see it.

The sea marker, if placed in the water at the first sound of the plane, will form a large greenish-yellow spot on the surface, making the position of the raft visible.

If the sun is out, the mirror or a bright piece of metal is the best bet. These mirrors, which bear instructions on the reverse side, can be seen by a plane ten to fifteen miles away.

Upon spotting the raft, the plane notifies rescue units and within a short time the raft occupants are headed back to base.

The procedure outlined for the B-17 applies in general to the B-24, B-25, B-26 and A-20, with the exception of crash positions and the exits through which they escape.

Due to difficulty in ditching the B-24, Liberator crews have been advised to bail out, using one-man dinghy parachute packs, wherever possible. If ditching is necessary, however, almost the same procedure is followed.

Procedures for ditching the A-20 recommend that the bombardier bail out since his position in the nose of the ship is considered dangerous, and he has no other exit.

As for the B-25, power-off at 2,000 feet must be maintained if the top turret gunner and radio operator are to climb over the bomb bay onto the flight deck.

Procedures suggested in posters being prepared by the Office of Flying Safety are recommended merely as a guide to ditching. Because plane models are constantly undergoing revision, pilots have been advised to adapt the practice to comply with the model being flown.

Since land planes are not designed for sea worthiness, success in every ditching cannot be guaranteed even if proper procedure is followed. However, constant drill in such procedure will assure personnel a greater chance of survival. ☆

Roll of Honor

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

DISTINGUISHED SERVICE CROSS

Oanver, Edison K., S/Sgt.
(Also PH and AM with OLC)
De Genaro, August V., Lieut.
Ouval, Jessie V., Lieut.
(Also PH, OFC and AM with 3 OLC)
Embree, Hoy D., S/Sgt.
Forrest, Nathan Bedford, Brig. Gen.
Gibson, Balfour C., Lieut.
Harris, Arizona Todd, T/Sgt. (Also AM)
Harrison, James A., S/Sgt.
Johnson, Theron E., S/Sgt.
Jones, William, Jr., Lieut.
McGrath, Thomas J., S/Sgt.
(Also PH and AM with 3 OLC)
Vondrachek, Charles E., S/Sgt.

DISTINGUISHED SERVICE MEDAL

Stratemeyer, George E., Maj. Gen.
Viccellio, Henry, Lieut. Col.

LEGION OF MERIT

Amen, Henry J., Jr., Major
Anderson, Frederick L., Jr., Brig. Gen.
Bednarchuk, Antoni, S/Sgt.
*Braswell, John C., Lieut.
Breene, Robert G., Maj. Gen.
Carter, John F., Lieut.
Connolly, Donald H., Maj. Gen.
Daugherty, Jean H., Capt.
Dawson, Thurman E., Lieut.
Day, Jack E., W/O
Fretz, Eugene J., Lieut.
Gilardi, Albert J., Capt.
Grow, Malcolm C., Col.
Harmon, Hubert M., Maj. Gen.
Hunter, Frank O'D., Brig. Gen.
Jamison, Glen C., Brig. Gen. (Also DFC)
Johnson, Robert L., Sgt.
Lahm, Frank P., Brig. Gen.
Loomis, Francis J., Maj.
Maxwell, Warren A., Col.
Monteverde, Armand L., Capt.
McGinnis, Harold A., Col.
Nauruth, Howard M., Pvt.
Redburn, Ralph A., Maj.
Samford, John A., Col.
Shafer, Robert H., Lieut.
Smith, Alhert D., Col.
Snouffer, William N., Lieut. Col.
Spencer, Harry E., Jr., Lieut.
Spina, Paul J., Sgt.
Stern, Benjamin, Brig. Gen.
Strahm, Victor H., Brig. Gen.
Sweetser, Luther W., Jr., Col. (Also AM)
Towle, Stewart W., Jr., Col.
Von Kolnitz, Alfred H., Maj.
*Walch, Felber J., Lieut.
Walker, William J., M/Sgt.
Wallis, Francis L., S/Sgt.
Walsh, Robert L., Brig. Gen.
*Wedel, Clarence, Pvt.
Wesley, Harold B., Capt.

SILVER STAR

Abraham, George M., S/Sgt.
Allen, Brooke E., Col.
Andrews, Vernon E., S/Sgt.
Arnone, Philip, S/Sgt.
Austin, Gordon H., Col.
(Also DFC and AM with 10 OLC)
Ayres, James A., Pvt. *(Also PH)
Baker, Francis W., T/Sgt. (Also DFC and AM)
Barnes, Roger T., S/Sgt. (Also AM)
Barr, Edgar E., Lieut.
Bartholomei, Victor H., Lieut.
Bartlett, George H., Lieut.
Bertram, William E., Lieut.
Bills, Ralph C., Pvt.
Block, Robert A., S/Sgt. (Also DFC)
Botts, Jack H., S/Sgt.
Brady, John M., Sgt.
Brannan, Henry P., S/Sgt.
Brinson, Sheldon S., Lieut.
Broadwell, Walter J., Capt. (Also AM)
Broman, Theodore H., Lieut.
Brown, Bartow Dean, F/O
Brum, Herbert L., T/Sgt. (Also AM)
Castle, Frederick W., Col.
De Shazo, Robert V., Lieut. Col.
Dolph, Robert H., S/Sgt.
Ou Bois, Charles H., Jr., Lieut.
(Also DFC and AM)
Oyas, John R., Maj.
Edwards, Theodore H., Sgt.
Ferraiolo, Joseph, Sgt. (Also PH and DFC)
Fincher, Oettis H., Lieut.
Ford, V., Lieut.
Gladhart, David F., Lieut.
Gordon, Bobby H., Sgt.
Green, Malcolm, Jr., Lieut. Col.
Hane, Frank C., Lieut.
(Also PH, DFC and AM)
Hanna, Walter J., Jr., Maj.
Harding, Neil B., Col.
Hill, Rowland G., Lieut.
Hills, Frank J., Lieut. Col.
Hultgren, Russell L., Sgt.
(Also DFC and 2 OLC to AM)
Hunt, Jim H., Sgt.
Jennings, Jack H., Lieut.
Johnston, Richard B., Lieut.
Jordan, Rufus E., Lieut.
McClung, Robert A., Lieut.
Mcigs, Henry, Lieut.
Meiman, Bernard J., S/Sgt.
Moore, Joseph F., Lieut.
Murrey, John S., Capt.
Nutter, Sheldon H., Lieut.
Olson, Harlan H., Lieut.
Patterson, Phillip E., Sgt.
Paynter, Maurice A., S/Sgt.
Perry, Alan B., T/Sgt.
Petit, Robert L., Capt. (With OLC)
*Reed, Joseph C., Lieut. *(Also Air Medal)
Richardson, Roslyn C., S/Sgt.
Ruiz, Ernest C., Lieut.
Scholl, Walter, Jr., Capt.
*Shannon, Charles R., Lieut.
Simmons, John C., Jr., Lieut.
Skeldon, Joseph L., Lieut.
Smyth, Glee G., Lieut.
Terrell, Frederick R., Col.
Turnbull, Robert J., Sgt.
Vos, Eugene L., Sgt.
Welch, Darrell G., Capt.
Welch, Wilbert R., S/Sgt.
Wilson, Delmar E., Lieut. Col.
Wilson, Earl M., Lieut.
Young, Franklin F., Lieut.

PURPLE HEART

Ackridge, Leo C., Sgt.
Anderson, Fred E., T/Sgt. (Also AM)
Avery, Stephen M., Maj.
Ballard, Frederick J., Cpl.
*Beasley, Leland V., Pvt.
Bentley, William C., Col.
*Boyle, Arthur F., Pvt.
Brainard, Ceylon H., Lieut.
*Brower, Rennie V., Jr., Pvt.
Brown, Vincent Cayce, Lieut.
(Also DFC and AM with 3 OLC)
*Carlson, Lawrence R., Pvt.
*Church, Leroy E., Pvt.
Oecker, Walter B., Lieut.
*Defenbaugh, Russell C., Pvt.
*Eichelberger, Paul R., Pvt.
Land, George R., Jr., Lieut.
*Lango, Frank J., Pvt.
McWilliams, Robert, Lieut.
*Malatek, Joseph, Pvt.
Meyers, Harry M., S/Sgt. (Also AM)
*Moorhead, Lionel J., Pfc.
O'Brien, Donald G., Lieut.
*Reece, Philip O., Lieut.
Schatz, Jay J. G., Lieut.
Schoenauer, Lyle, Lieut.
*South, Wilmer W., Pvt.
*Stockwell, Carey K., Pvt.
*Sugrue, James F., Lieut. (Also AM)
Taucher, Ben T., S/Sgt.
Taylor, Paul R., S/Sgt.
*Tibbetts, Herman K., Pvt.
*Tuckerman, George W., Pvt.
White, Joseph W., Sgt.
*Zappala, Joseph S., Pvt.

SOLDIER'S MEDAL

Adams, Robert P., S/Sgt.
Barrett, Jesse W., T/Sgt.
Belenky, Eugene J., Sgt.
Bicket, Paul W., T/Sgt.
Blackman, Robert C., Lieut.
Blessman, Roy F., Cpl.
Broader, William E., Pvt.
Bryson, Paul H., Pvt.
Burkhart, Richard L., Pfc.
Cordell, James E., Cpl.
*Demorest, Max H., Lieut.
Elliott, Earl W., Pvt.
Emminger, Jerry W., Sgt.
Feather, William B., Sgt.
Fink, Edwin D., S/Sgt.
Fluharty, Wayne C., Pfc.
Furland, Paul F., Cpl.
Ganter, Eugene A., Pvt.
Hessenflow, Edmond L., Pfc.
Honea, Maurice L., Cpl.
Huey, Glenn, Pfc.
Kennedy, Arthur E., Lieut.
Lewis, Jackson W., Capt.
Lewis, John R., Cpl.
Lundell, Harvey G., S/Sgt.
Moenter, Joseph E., Pvt.
McDaniel, Clyde W., Pvt.
Newton, Robert E., Sgt.
Niszczak, Joseph J., T/Sgt.
Rawles, J. D., Sgt.
Reeves, Vernon H., Lieut.
Renna, Louis, Sgt.
Sabo, Alexander B., W/O
Simon, Reuben, Lieut.
Stowe, William A., Cpl.
Streicher, Refus E., Cpl.
Sweet, Robert E., Lieut.
Venturelli, Umberte, Cpl.
Wallace, Patrick E., Pvt.
Wexler, Nathan H., Capt.
Woodrum, James, M/Sgt.

DISTINGUISHED FLYING CROSS

Adams, Ralph B., S/Sgt.
Alexander, Ralph, S/Sgt. (Also AM)
Ambrosius, William H., Capt.
Anderson, Alt Lester, Cpl.
Anderson, James A., Lieut. (Also AM)
Armstrong, Ray W., T/Sgt. (With OLC)
Baca, Max S., T/Sgt. (Also AM)
Baker, Leonidas, Capt. (Also AM)
Baker, William V., S/Sgt.
Ballentine, Henry R., T/Sgt. (Also AM)
Ballantine, John V., Pvt.
Barber, Bernard L., Lieut.
Barefoot, Selwyn J., Capt.
(Also AM with OLC)
Barrman, James L., T/Sgt. (Also AM)
Barnhard, Francis Dewitt, Capt.
Barnes, Albert H., S/Sgt. (Also AM)
Barnes, Cecil G., Sgt. (Also AM)
Barnes, Charles, Sgt. (Also AM)
Barnum, Burrall, Capt.
Barr, Bernice S., Capt. (Also AM)
Barrs, Sidney D., S/Sgt. (Also AM)
Bates, James W., S/Sgt.
Baynes, Edward E., S/Sgt. (Also AM)
Bearden, R. T., S/Sgt. (Also AM)
Benish, Robert J., Capt.
(Also AM with OLC)
Bentz, Edward K., Sgt. (Also AM)
Berry, Robert, Lieut.
Bickett, George L., Sgt. (Also AM)
Bigham, James H., Cpl.
Billings, Harry C., Jr., T/Sgt.
Billingsley, Leonard, Lieut.
Billmaier, Lawrence P., Cpl.
Blanchard, Frederick W., M/Sgt.
Blankenburn, Charles, Jr., Capt.
(Also AM)
Bostwick, William E., Lieut. (Also AM)
Bradford, William B., S/Sgt. (Also AM)
Bradford, William R., Capt.
Brazelton, Leonard G., Sgt.
Brinkman, Willie E., Lieut.
Brown, Elton D., Lieut. (Also AM)
Brown, Llewellyn L., Lieut.
Brown, Therman D., Capt. (Also AM)
Brown, Vance, S/Sgt. (Also AM)
Bryant, Olen C., Lieut. (Also AM)
Burcky, Claude N., Lieut. (Also AM)
Burleigh, Albert H., Jr., Lieut.
Burnett, Pelham R., Lieut.
Busbee, Frank C., Lieut. (Also AM)
Campbell, James E., Lieut.
Campbell, William P., Lieut. (Also AM)
Carr, W. J., Capt.
Chandler, George W., Lieut. (Also AM)
Chennault, Claire L., Maj. Gen.
*Christy, John Y., Capt.
Clayton, R. L., Capt.
Clements, Pruitte L., T/Sgt.
Cofer, J. W., Capt.
*Cominole, David, Lieut. (Also AM)
Compton, Ruben C., T/Sgt.
Crabtree, Dale E., Sgt. (Also AM)
Crisp, Oennis, Capt.
Davenport, John D., Lieut.
Deans, E. G., Capt.
Doan, Donald F., S/Sgt.
Donovan, Charles Lane, Lieut.
(Also AM)
Oorband, Robert J., Sgt.
Doty, Oonald E., Sgt.
Durham, Meredith E., T/Sgt. (Also AM)
Easter, Edward M., Cpl.
Eckley, Paul W., Jr., Lieut. (Also AM)
Edwards, Milton B., S/Sgt.
Edwards, Samuel, S/Sgt.
Eisenbrown, Walter Thomas, Lieut.
(Also AM)
Feltz, Maurice Stephen, Lieut.
Feramisco, James, Sgt.
Fetrow, Gene B., Capt.
(Also 3rd OLC to AM)
Fitgerald, Martin J., S/Sgt. (Also AM)
Flesher, Isaac A., S/Sgt.
Fox, Leonard M., T/Sgt.
Frederick, Harry R., Sgt.
Garriott, John A., T/Sgt.
(Also AM with 3 OLC)
Glassburn, Kenneth L., Lieut. (With OLC)
Glenn, Ralph C., Pvt.
Glenn, Symie L., S/Sgt. (With AM)
*Gough, Albert, Capt.
*Hansen, James S., Lieut.
Hanson, Paul, S/Sgt.
Harrison, Arthur O., Sgt.
Hastings, Richard, F/O
Hawley, Daniel Charles, Lieut.
Henriksen, Everett N., Lieut. (With OLC)
Higgins, Clarence G., S/Sgt.
Hinton, Percy M. Capt. (Also AM)
Holsey, Raymond E., Lieut.
Howk, Leon, Lieut. (Also AM)
Huey, Stanley George, Maj. (Also AM)
Hughey, Robert J., Maj. (Also AM)
Humphries, John R., Jr., Lieut. (Also AM)
Jackman, Robert J., S/Sgt.
Johnson, Emil L., Lieut.
Kersch, Conrad J., T/Sgt. (With DLC)
Kerulis, John P., S/Sgt. (Also AM)
Kicklighter, Conrad, Sgt.
Kiger, Orville W., S/Sgt. (Also AM)
Kocinaus, Stanley J., Pvt.
Krieg, Philip R., Capt.
*Laberge, Lawrence L., Lieut.
Lanic, Fulton P., Lieut. (Also AM)
Leland, Glen V., Jr., Lieut.
Lenhardt, Edward J., S/Sgt.
Lincoln, Wayne E., Cpl.
Lindley, Harold O., S/Sgt.
Londer, Maurice L., Sgt.
(Also AM)
Lowder, Guy M., Cpl.
Lyons, George, Lieut.
(Also AM)
McBride, Charles R., Cpl.
McClaran, Clarence E., Capt.
McCoun, Gordon K., Lieut.
McCullough, J. A., Lieut.
McDevitt, Thomas E., Cpl.
McGarry, Christian H., Lieut.
McGrath, Thomas R., S/Sgt.
McKinney, Louis V., Lieut.
(Also AM)
McRoberts, Ellsworth E., Lieut.
(Also AM)
Makuh, John E., S/Sgt.
(Also AM)
Mallett, Frank, Sgt.
Matula, Nick, S/Sgt.
Maxwell, Lee W., Jr., Capt.
Meenagh, William F., Lieut.
(Also AM)
Michael, Oliver C., Cpl.
Miller, Donald C., Capt.
(With DLC and AM)
Morrell, Eddie M., Lieut.
(Also AM)
Moringstar, Joseph B., Lieut.
Morris, Ralph T., Sgt.
Morris, Robert F., S/Sgt.
Morrison, William J., S/Sgt.
Munson, Raymond G., Lieut.
Murphy, Daniel J., S/Sgt.
Nibley, Charles M., Sgt.
Nice, Albert T., Lieut.
(Also AM)
Norgaard, Arthur E., S/Sgt.
O'Oonnell, John C., Lieut.
Ogle, Thomas Lee, Jr., Lieut.
Olson, Orwin S., Cpl.
Ortiz, Cirilo O., Lieut.
Osborne, Edward G., Sgt.
(Also AM)
Owen, John E., S/Sgt.
Pacheco, Herman S., Jr., S/Sgt.
Padget, Cadman V., Lieut.
(Also OLC to AM)
Parsons, Hershell Echoll, Capt.
Parsons, Levi E., Jr., Cpl.
Peeples, Jack T., Capt.
*Phelan, Edward H., Jr., Lieut.
Poole, Harley, S/Sgt.
(Also AM)
Porter, William W., S/Sgt.
Prince, Nathan D., Sgt.
*Probst, Victor V., T/Sgt.
(Also AM)
Proctor, Edwin Allen, Capt.
Pylant, James H., Cpl.
Rathbone, Franks S., Jr., Lieut.
*Reece, Leslie E., Lieut.
Reid, Orland L., Lieut.
Reynolds, Norris T., S/Sgt.
(Also AM)
Reynolds, Oneal S., T/Sgt.
Rice, Charles D., Sgt.
Richards, George M., Lieut.
Rogers, Clarence, Cpl.
Rohr, Victor E., Cpl.
Roussel, Wilbur C., W/O
(Also AM)
Roy, Joseph S., Sgt.
(Also AM with 3 OLC)
Ryan, John L., Capt.
Sage, William I., S/Sgt.
(Also AM)
Scarboro, Paul J., Lieut.
(Also AM)
Schadt, Martin M., T/Sgt.
(Also AM)
Scharp, Melvin C., S/Sgt.
Scherfey, Noel H., Lieut.
Schmid, George W., Sgt.
(Also AM)
Schneider, Edwin A., Lieut.
(With OLC)
Sell, Ramon C., S/Sgt.
Shafer, Eugene D., T/Sgt.
(Also AM)
Shemberger, James F., Sgt.
Shore, Walter G., Lieut.
(Also AM)
Silsby, Edward M., S/Sgt.
Slater, Richard I., Sgt.
Smartt, Clare M., Lieut.
*Smith, Fred M., Capt.
*(With OLC)

* Posthumous
† Air Carrier Contract Personnel, ATC

Lt. P. H. Daniels, 3d

Capt. Leonadis Baker

Lt. Maurice S. Feltz

Lt. Floyd S. Funk

Col. W. C. Bentley

T/S J. H. Thornton

Smith, Ray J., S/Sgt.
Smith, William C., S/Sgt.
Snyder, Delmer S., S/Sgt.
Staples, George M., Lieut.
Stearns, Willard R., Lieut.
Stein, Edward G., Cpl.
Steiner, Albert A., Lieut.
*Stephens, Maurice L., Capt.
Stipech, Frank R., Sgt.
Starr, Harold J., Sgt.
Stitt, Austin W., Jr., Capt.
(Also AM)
Stone, Elmer Jackson, Lieut.
Stoverm, George E., Lieut.
Sugg, Leroy, Lieut.
*Sullivan, John F., Capt.
Taylor, Homer R., Lieut.
Thall, Edward, Cpl.
Thorne, Ola P., Capt.
Turner, Kenneth H., Capt.
Upchurch, Gaston R., T/Sgt.
Urban, Harry, M/Sgt.
Wagner, Willis F., Lieut.
(Also AM)
Walker, Talmadge E., Lieut.
Walsh, James F., S/Sgt.
Watkins, Harvey O., Jr., Sgt.
West, William G., Cpl.
Whitehead, Charles D., Sgt.
Whitman, William B., S/Sgt.
Wise, John W., Lieut.
Woods, Merle C., Lieut.
(Also AM)
Zatzke, Frank W., Lieut.
(Also AM)
Zeamer, Jay, Capt.

OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

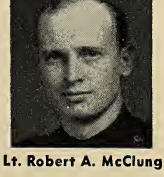
Casper, Kenneth D., Maj.
(Also AM)
Cottage, Stanley, Lieut.
(Also AM)
Ford, Emmette W., Lieut.
(Also AM)
Geckeler, John M., Lieut.
(Also AM)
Griffin, William J. P., M/Sgt.
(Also AM)
Payne, Conrad R., Lieut.
(Also AM)
Tarbutton, Paul R., Capt. (2nd)
Vail, Raymond M., Sgt.
Wallach, John A., Lieut.
(Also AM)
White, Herbert C., Jr., Lieut.
Wiest, Herbert E., Lieut.
(Also AM)

AIR MEDAL

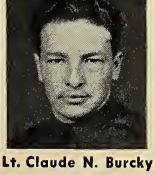
Agee, James R., Sgt.
(With OLC)
Akes, Charles D., Pfc.
Alderson, Robert H., S/Sgt.
Alison, John R., Lieut. Col.
Alleman, Charles R., Sgt.
Allen, William, Sgt.
Allison, Otis E., Lieut.
(With 2 OLC)
Ames, Robert G., Sgt.
Anderson, Samuel H., Lieut.
(With 2 OLC)
Anderson, William M., Lieut.
Andrews, Norman L., Lieut.
Applee, Frank H., S/Sgt.
Ard, Gilbert H., Sgt.
Armstrong, Robert, Lieut.
Arnold, Rupert W., S/Sgt.
Arsenault, Lawrence J., S/Sgt.
Ascol, Holiel, S/Sgt.
Auger, Clifford M., Pvt.
Avdevich, Fillmore, Lieut.
Bailey, William A., Jr., Capt.
Baker, Edwin C., Capt.
Baldassare, Walter, Sgt.
Beringer, John L., S/Sgt.
Berry, Houston B., S/Sgt.
Bevan, Donald J., Sgt.
(With 3 OLC)
Biggers, Charles E., Lieut.
Biggs, Albert C., Lieut.
Bird, Clement W., Lieut.
Birdsong, George P., Lieut.
Blackwell, Westley V., S/Sgt.
Blake, Robert C., S/Sgt.
(With OLC)
Blanchard, George W., Lieut.
Bloomfield, Thomas F., Lieut.
Blum, Edward F., Lieut.
*Boehm, Walter, Sgt.
Bogert, William D., Sgt.
Bohlen, Dean W., Lieut.
(With OLC)
Bolle, Norman N. V., Lieut.
(With OLC)
Boluch, Stephen, Lieut.
Bono, Jim K., Lieut.
Boney, Warren X., Lieut.
Bootne, Harry J., Lieut.
(With 3 OLC)
Borostowski, Benedict B., T/Sgt.
Borowsky, Joshua, Sgt.
Bowie, Donald R., S/Sgt.
Bowman, Horace D., Lieut.
Bowman, John Poole, Lieut.
Boylan, George S., Jr., Lieut.
Brady, John B., Capt.
Brandt, Waldo B., S/Sgt.
(With OLC)
Bragg, Kendrick, Lieut.
(With 3 OLC)
Brannon, Joseph W., Sgt.
Brewnig, Wilbur W., Lieut.
Brewster, Edward M., Lieut.
Brodsky, Edward J., Lieut.
Brookhart, Joseph, Lieut.
Broussard, Eddie J., Capt.
Brousseau, Andre R., Maj.
†Brown, J. E., ATC
*Brown, Willard L., Lieut.
Bruckheimer, David, Lieut.
Brumett, Lee S., Sgt.
(With 2 OLC)
Buckner, Kermit C., S/Sgt.
Burns, Francis J., S/Sgt.
Burnstad, Basil B., Lieut.
(With OLC)
Bush, Edwin R., Lieut.
Caivano, Albert F., Sgt.
Campbell, Robert B., Capt.
Canham, Arthur Eldridge, Lieut.
(With 2 OLC)
Carboni, Dominick, Sgt.
Carney, Arthur O., Sgt.
Carr, Joseph P., Lieut.
(With OLC)
Carter, Arthur C., Lieut.
Chesser, Robert E., Lieut.
Christy, Charles W., Lieut.
Clancy, William E., Capt.
Clark, Roderick C., S/Sgt.
Clifton, Raymond C., T/Sgt.
Clymer, Gerald F., Lieut.
(With OLC)
Coates, Darrell W., S/Sgt.
Colantoni, William, Lieut.
Comns, Wack, Sgt.
Conner, William H., Lieut.
(With 2 OLC)
Cook, Emmett G., Lieut.
Cook, Warren G., Sgt.
Cooke, Charles J., Lieut.
Courtney, Clyde Thomas, Sgt.
Cox, Burton D., Lieut.
Coyle, Gervais G., Lieut.
Crandall, Arthur L., S/Sgt.
Crane, John E., Lieut.
Cranmer, Edwin A., Lieut.
Crichton, Douglas E., Lieut.
Croon, Richard D., S/Sgt.
(With OLC)
Crouch, Horace E., Capt.
Cruikshank, Arthur W., Jr., Lieut.
Cummings, Duke D., Lieut.
(With OLC)
Curtis, Ferd J., Lieut.
*Curtis, Frazier, Lieut.
Dalton, Dean H., Lieut.
Damaske, Marvin L., T/Sgt.
Daniels, James J., Sgt.
Daniels, Patrick H., III, Lieut.
Darden, James H., Lieut.
Dasher, Everett A., T/Sgt.
†Davidson, John F., ATC
Davis, Charles J., S/Sgt.
Davis, Charles M., S/Sgt.
Davis, Elvin Albert, S/Sgt.
(With OLC)
Davis, Gene F., Lieut.
Davis, Robert E., Lieut.
Day, Donald E., S/Sgt.
Dayley, Burns Richard, S/Sgt.
Dean, George B., Lieut.
Deboy, Peter F., T/Sgt.
DeBusk, James H., Sgt.
Decker, Kenneth R., Sgt.
Dennis, Stephen C., Lieut.
Depke, Robert W., Lieut.
Dern, Ernest W., S/Sgt.
Dexter, John H., Lieut.
Dick, Charles S., Sgt.
Dobson, Gene H., S/Sgt.
Dowd, William H., Lieut.
Downs, Emory M., Lieut.
Drake, Carl H., Sgt.
Drake, Clarence H., Lieut.
Dreher, John S., Lieut.
Dudeck, Edward J., Lieut.
Dumas, James A., Lieut.
Dunham, Howard M., Lieut.
Dunham, Volta A., Jr., Lieut.
Dustin, Kenneth H., Lieut.
Eareckson, William O., Col.
Edward, James O., S/Sgt.
(With 2 OLC)
Edwards, Lyle V., T/Sgt.
Ehrhardt, Clark A., S/Sgt.
Eidson, Jordon B., Sgt.
Elleden, Raymond P., Lieut.
Elliot, Wilson C., S/Sgt.
Embach, John W., Lieut.
Emerson, Arthur R., Lieut.
Emery, Albert W., T/Sgt.
Epperson, Malcolm N., S/Sgt.
Espitallier, Eddie F., T/Sgt.
Evans, Frank B., Lieut.
(With 2 OLC)
Farnworth, Stanley L., S/Sgt.
Farrar, John W., Lieut.
Ferguson, John S., Sgt.
Ferrara, John C., Lieut.
(With OLC)
Ficeto, Bartholomeo Tony, Sgt.
(With OLC)
Finneburgh, Edward I., Lieut.
Finney, George R., Sgt.
Fitzgerald, Robert J., S/Sgt.
Fleming, Eugene B., Sgt.
(With OLC)
Fonorow, Milton S., Lieut.
Ford, William A., Jr., S/Sgt.
Fore, DeWitt C., Capt.
Fortin, Raymond W., Lieut.
Fowler, Raymond B., Lieut.
Fox, Gayle S., Lieut.
Frelign, Gerald C., Sgt.
Frixholz, John T., T/Sgt.
Fulton, Frederick Peter, Lieut.
Funk, Floyd S., Lieut.
Gable, Clark, Capt.
Gannon, James F., Sgt.
Garner, Stanley C., T/Sgt.
Garrett, Wilmer J., Lieut.
Gates, Frank A., T/Sgt.
Gillogly, Fred D., Lieut.
Gilman, Mark H., Lieut.
Gilroy, Walter E., T/Sgt.
Gipple, Harvey W., Sgt.
Glover, Harold Elmer, S/Sgt.
(With 2 OLC)
Good, George E., Lieut.
Goodrich, Miles C., M/Sgt.
Graddy, William C., S/Sgt.
Grainger, James R., S/Sgt.
Granoff, John H., Sgt.
Grant, Reginald D., Lieut.
Graves, Alvin L., Lieut.
Gray, Deckerd J., Jr., S/Sgt.
Green, George L., Sgt.
Green, William A., T/Sgt.
Greene, Donald R., Lieut.
(With OLC)
Grell, Gerald C., Lieut.
Greve, Thomas E., Lieut.
Gritsonis, Nickolas C., S/Sgt.
Gross, Gale H., Sgt.
Grube, Willie W., Lieut.
Guthrie, Allen S., Pfc.
Haas, Joseph E., Lieut.
Hagenbuch, Glenn E., Capt.
Hails, Clair D., S/Sgt.
Hale, Zeffra I., Capt.
Hamilton, Joseph L., Lieut.
Hamilton, Linton D., Lieut.
Hamilton, Robert A., Sgt.
Hammer, Arthur J., Lieut.
Hancock, Robert E., A/C
Hanks, Joseph D., S/Sgt.
Hansbury, Thomas J., S/Sgt.
Hansen, Dale W., S/Sgt.
(With OLC)
Hardwick, James W., Lieut.
Harmon, Edward Z., Sgt.
Harris, Frances H., Capt.
Harris, Maurice L., Sgt.
Harris, Reginald G., S/Sgt.
(With OLC)
Hart, Lindsay C., Lieut.
Hartman, William J., Lieut.
Harvey, Herbert H., T/Sgt.
Harvey, John F., Lieut.
Hatleberg, Maynard M., T/Sgt.
†Hay, James B., ATC
Haynes, Robert R., Sgt.
Hays, Marlborough L., Sgt.
Haywood, James W., S/Sgt.
Hazleton, Walter L., S/Sgt.
(With OLC)
Heap, Howard A., S/Sgt.
Hubbard, Henry F., Lieut.
Hubbell, Olan L., Lieut.
Hudson, Henry D., Lieut.
Huggins, Harry W., Sgt.
Hughes, Aquilla B., Jr., Capt.
Hughes, Septimus R., Lieut.
Humphries, Bert W., Lieut.
(With OLC)
Hunt, William Louis, Lieut.
Hurlbert, Norman F., S/Sgt.
Hussleton, John W., S/Sgt.
Hutson, Joseph T., T/Sgt.
(With 2 OLC)
Hutter, William B., T/Sgt.
Hutton, John N., Lieut.
Ingram, Donald H., S/Sgt.
Isbell, James A., Lieut.
Jacknik, Frank J., Lieut.
*Jackson, Everett C., S/Sgt.
Jefferson, Harley W., Lieut.
Jeffries, Oren L., Lieut.
Jester, Donald E., S/Sgt.
Joffrion, Joseph S., S/Sgt.
Johns, Malcolm B., S/Sgt.
Johnson, Billy S., S/Sgt.
Johnson, Charles C., S/Sgt.
Johnson, Gerald R., Lieut.
(With OLC)
Johnson, Grove C., Lieut.
Jones, Jerald H., Sgt.
Jordan, Roy E., Sgt.
Joslin, John W., Lieut.
Jostenski, Robert B., Lieut.
Karanson, William A., Jr., S/Sgt.
Keen, William R., Sgt.
Keenan, James H., Capt.
Kehoe, Nicholas B., Jr., Lieut.
Kissenbarth, Stanley N., Lieut.
Kitzman, Gordon A., Lieut.
Klug, Lester G., Sgt.
Knippel, George C., M/Sgt.
Krippner, Howard L., Lieut.
Kruszynski, Gerald J., T/Sgt.
(With OLC)
Kuhn, Merton, T/Sgt.
Kuenning, Thomas E., Lieut.
Kulchesky, Harry, S/Sgt.
Kurtenbach, Kenneth J., S/Sgt.
Kuzdrall, Anthony A., M/Sgt.
(With OLC)
Kwasneske, Henry J., S/Sgt.

(Continued on next page)

Capt. J. H. Keenan



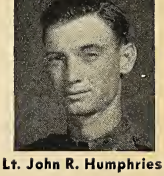
Lt. Robert A. McClung



Lt. Claude N. Burcky

Lt. Deltis H. Fincher

Capt. G. Davidson, Jr.



Lt. John R. Humphries

Roll of Honor

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

Lawson, Clarence V., Lieut.
Leary, Edward J., Sgt.
Leasure, William C., Lieut.
Lecuyer, Orval E., S/Sgt.
Lee, James F., Lieut.
Leeker, Walter C., Lieut.
Leines, Harold Jerome, S/Sgt.
Leow, Richard E., Lieut.
Lewis, Grant R., S/Sgt.
(With OLC)
Lipe, Fort W., Lieut.
Lockhart, Russell O., Lieut.
Loewecke, William E., Lieut.
(With OLC)
Long, Alan W., Capt.
Long, Winfield V., S/Sgt.
Lowery, Glen F., Lieut.
Lubner, Martin M., Lieut.
Lucas, Jack, Sgt.
Ludlow, Jack, Lieut.
(With 2 OLC)
Ludolph, George L., Lieut.
Ludwig, William R., Capt.
Lugasewitz, Julius V., Sgt.
Lundy, James T., Lieut.
(With OLC)
Lunsford, Hoyt H., Lieut.
Luschen, Frank L., Lieut.
Luther, Martin, Lieut.
(With OLC)
Lutz, John R., Lieut.
Lyle, Lewis E., Jr., Lieut.
Lyman, Thomas G., Lieut.
Lynch, Joseph, S/Sgt.
MacDonald, Donald W., Maj.
McAdams, Lee O., Jr., S/Sgt.
McArthur, T. H., Capt.
McCabe, Kenneth C., Sgt.
McCarthy, Eugene J., Capt.
McCarty, Martin W., Jr., Lieut.
McCauley, Anthony C., S/Sgt.
McCord, Robert R., Lieut.
McCurdy, Arthur, Lieut.
McDaniel, Abner O., Lieut.
McDonald, Robert Lewis, Lieut.
McDonnell, Walter S., Lieut.
McDonnell, William J., Sgt.
McEntire, Bruce M., Lieut.
McFerrin, Jesse W., Lieut.
McGahan, Chester, Lieut.
McGehee, Thomas K., Maj.
McGill, Woodrow M., Lieut.
McKay, Mack, Capt.
McKee, Carrick, S/Sgt.
McKelvey, Van Dyke, Lieut.
McKesson, Lewis R., Lieut.
McKinnon, Frederick W., Jr., Lieut.
† McMakin, Ralph A., ATC
McWilliams, Major H., Lieut.
Magee, Roland, S/Sgt.
Mahan, Lloyd J., S/Sgt.
(With OLC)
May, Chester H., Lieut.
May, John M., Sgt.
May, Otis W., Lieut.
Mayotte, Robert A., T/Sgt.
Means, Lucian W., Jr., T/Sgt.
Meaux, Allan F., S/Sgt.
Mehales, John, S/Sgt.
Melton, Robert E., Lieut.
Mendenhall, Dean, Lieut.
Meyer, Charles F., Lieut.
Middleton, Laula Mathew, Lieut.
(With OLC)
Migdat, Walter M., S/Sgt.
Miller, Norris C., T/Sgt.
Miller, Robert C., Lieut.
Milliner, James H., S/Sgt.
Mills, Hawley Pierce, Lieut.
Milnes, Arthur C., Sgt.
Miser, Harry O., S/Sgt.
Mitchell, Anthony R., Lieut.
Mock, Jacob S., Jr., Sgt.
Mohler, William A., S/Sgt.
(With OLC)
Mohr, Homer H., Lieut.
Monaghan, Bernard I., Cpl.
Monroe, Rayford L., T/Sgt.
Moon, Billy E., Lieut.
Moore, Albert K., Lieut.
Moore, Donald M., Lieut.
Moore, Leonard J., Lieut.
Moore, Robert T., Sgt.
Moore, Wilson, Capt.
Moorer, William G., Lieut.
Morgan, Robert, S/Sgt.
Morgan, Robert K., Capt.
Morrison, Samuel M., Sgt.
Moser, George R., Lieut.
Muldoon, Bernard R., Lieut.
Mulligan, James C., S/Sgt.
Mullen, Everette J., Jr., Lieut.
(With OLC)
Mulvana, John B., Lieut.
Murphey, William F., S/Sgt.
Murphy, Kimmel P., Capt.
Murray, Gilbert A., S/Sgt.
(With OLC)
Naismith, Robert E., Lieut.
Nall, Charles C., Cpl.
Nance, Clifford P., S/Sgt.
Nardine, Howard H., S/Sgt.
(With OLC)
Nease, Charles M., Sgt.
Nelson, Norman R., Lieut.
Newman, Fred J., Sgt.
Nichols, Edgar S., S/Sgt.
Nielsen, Leland C., Lieut.
Niver, Keith M., S/Sgt.
(With OLC)
Nold, Woodrow V., Capt.
Nothstein, Howard, S/Sgt.
Nysteen, Norman A., Lieut.
O'Brien, Leonard H., Sgt.
Ochsner, Lee A., S/Sgt.
Odell, Edward N., Lieut.
Ogan, Wilson E., T/Sgt.
Olds, Sherwood W., Lieut.
Oliver, Ralph L., Maj.
Orchard, William, Capt.
Ormand, Waverly C., T/Sgt.
Orris, Harry F., S/Sgt.
Pace, Lawrence B., Lieut.
Pack, James L., S/Sgt.
Padget, Charles A., Lieut.
Paine, Charles J., Lieut.
Pennington, James L., Sgt.
Pennoyer, Jordan M., Lieut.
Perkins, Charles V., Sgt.
Perry, William W., Capt.
(With OLC)
Peterson, Herbert M., Sgt.
Peterson, Richard A., S/Sgt.
Peterson, Warren C., Capt.
Peylock, Thomas R., Sgt.
Phillips, Charles R., Lieut.
Phillips, Reginald H., Lieut.
Pietrowski, Walter, S/Sgt.
(With OLC)
Plaskett, Kermit R., S/Sgt.
Plecha, Stanley L., Lieut.
Ploeger, Roy I., M/Sgt.
Polhamus, Floyd C., S/Sgt.
Porter, Lambert C., Lieut.
Powell, John F., S/Sgt.
(With 2 OLC)
Powers, John O., Lieut.
Praul, George L., Pvt.
Prescott, Paul H., S/Sgt.
Price, Jarald C., Capt.
Prichard, Jarvis B., Lieut.
Prieston, George E., Capt.
Pritsky, Joseph J., Lieut.
Pruitt, Elliott C., Lieut.
Purdy, Norman E., Lieut.
Quickel, Cortez S., Lieut.
Quinn, John J., Lieut.
Rabinovitz, Harry, Cpl.
Rabo, Fred A., Lieut.
Ragland, William A., Lieut.
Railo, Jacob W., S/Sgt.
Ramputi, Frederick R., Lieut.
Rand, Claude M., Sgt.
Raymer, Winston C., S/Sgt.
Rebello, Francisco, Sgt.
Reeder, Jack O., Capt.
Regan, James, Lieut.
Reigh, Carl B., Cpl.
Rethman, Vincent C., Lieut.
Rex, John L., Jr., Lieut.
Reynolds, Joseph C., Lieut.
Ribeck, Joseph, Sgt.
Ridnour, Gerald J., Sgt.
Riechers, Delbert W., Sgt.
Rieman, Robert R., Lieut.
Roberts, Wallace M., S/Sgt.
Robertson, Arthur B., Jr., Lieut.
(With OLC)
Robinson, Richard R., S/Sgt.
Rooney, John W., Lieut.
Roder, Kenneth V., S/Sgt.
Roitsch, Clarence A., Lieut.
Rolf, Leland S., Lieut.
(With OLC)
Rooke, Walker, Capt.
Rooney, John W., Lieut.
Roozen, Edwin C., Lieut.
Roth, Charles L., S/Sgt.
Rouse, Arthur, Jr., Lieut.
Rovraro, Ermando P., S/Sgt.
Rowland, Daniel W., S/Sgt.
Rukes, Merlyn D., S/Sgt.
Ruppenthal, John J., Lieut.
(With OLC)
Ruse, John C., Capt.
Russel, Roy C., Lieut.
Ryan, James A., Lieut.
Sagnibene, Charles V., S/Sgt.
Salitrnik, Robert J., Lieut.
Sanderson, Ellis J., Lieut.
Sauer, Robert R., Lieut.
Savage, Francis E., Lieut.
Sawyer, William F., Lieut.
Saylor, George R., T/Sgt.
Scannell, Joseph W., Lieut.
Schafer, Robert T., S/Sgt.
Schepis, Thomas F., Lieut.
(With OLC)
Schildt, William J., Lieut.
Schlafmitz, Leonard, Sgt.
Schneiderman, Henry G., S/Sgt.
Schweidtman, Ray J., Lieut.
Scott, John W., Lieut.
Sedore, Richard S., Sgt.
(With OLC)
Sennott, William J., Jr., Sgt.
Sentz, Vernon R., S/Sgt.
Setzer, Marvin J., Lieut.
Sproi, Anthony, Lieut.
Shaeffer, Earl A., Lieut.
(With OLC)
Sharp, Budrow C., S/Sgt.
Sharp, Frank O., Maj.
Shaw, Roger T., Lieut.
Shelfer, Edward P., Pfc.
Shepard, William G., Capt.
Sherwood, Lyle O., Lieut.
Shirley, Homer C., Lieut.
Short, Willard K., Lieut.
Sibold, George G., S/Sgt.
Siboski, William R., S/Sgt.
Siler, Stanton T., Sgt.
Silk, Lawrence J., Jr., Sgt.
Simmons, Herbert W., Lieut.
Simmons, Hyram C., S/Sgt.
Simons, Raymond L., T/Sgt.
Singletery, Harold C., S/Sgt.
Skipp, Francis E., Jr., Lieut.
Slankard, Paul B., S/Sgt.
Slater, Carl W., Sgt.
(With OLC)
Sledd, Claude, Jr., Capt.
Sloan, Charles R., Lieut.
Sloan, George E., Lieut.
Sloan, William J., Lieut.
Small, Mitchell, Sgt.
Smart, James L., Lieut.
Smith, Albert G., Lieut.
Smith, Darwin N., Sgt.
Smith, Edward H., Sgt.
Smith, Gene K., T/Sgt.
‡ Smith, G. W., ATC
Smith, John R., Lieut.
Smith, John W., Lieut.
Smith, Joseph Russell, Lieut.
Smith, Lemuel B., Lieut.
(With OLC)
Smith, Merle Elmer, Lieut.
Smith, Richard L., Sgt.
Smith, Robert W., Lieut.
Smith, Sidney T., Capt.
Sommer, Leonard W., S/Sgt.
Soria, Peter, Sgt.
Soup, John R., Lieut.
Spring, Gilbert M., Lieut.
Spurrier, Odith K., Lieut.
Stage, Albert Ames, S/Sgt.
(With OLC)
Stanley, Samuel, Lieut.
Stamatelos, Pete O., S/Sgt.
Stampon, Peter J., Lieut.
Stanek, Bernard J., Lieut.
Stappler, Robert F., Lieut.
(With OLC)
Starbuck, James H., Maj.
(With OLC)
Steele, Earl A., Lieut.
Stein, Eugene H., S/Sgt.
(With OLC)
Steiner, Irwin O., Lieut.
Stellhorn, Bernard A., S/Sgt.
Stephens, Wilson M., S/Sgt.
Stephey, Harry M., Lieut.
(With OLC)
Stevens, David M., Lieut.
* Stockard, Luther B., Lieut.
Stokes, Woodrow H., Lieut.
Storey, Seely M., S/Sgt.
Stout, George A., Lieut.
Stover, Glenn R., Lieut.
Strauss, Kenneth R., Lieut.
Stuart, Harold K., Lieut.
Stupelli, Harvey L., Sgt.
Swais, John T., Capt.
Swenson, Donald A., Lieut.
Swiney, James P., S/Sgt.
Sylvester, Joseph J., Lieut.
(With OLC)
Taylor, Albert O., Sgt.
Taylor, John J., Lieut.
(With OLC)
Taylor, Walter R., T/Sgt.
Tedder, John G., Cpl.
Thomas, Homer E., Lieut.
Thomas, Jerry E., Lieut.
(With OLC)
Thomas, Reuben L., Jr., Lieut.
Thompson, Charles S., Jr., Lieut.
Thompson, Clyde A., Lieut.
Thompson, Garnett B., Sgt.
Thompson, James O., S/Sgt.
Thompson, Norman L., S/Sgt.
Thompson, Thomas E., Cpl.
Thomson, John A., Lieut.
Thornbury, Edward M., Lieut.
Thornton, James Henry, T/Sgt.
(With OLC)
Tidwell, John L., Sgt.
Tolar, Robert F., S/Sgt.
Tracy, George A., S/Sgt.
Trankle, Herbert B., Lieut.
Trimpe, Melvin J., Lieut.
Tudor, James R., Lieut.
(With OLC)
Twiggs, George S., Lieut.
Uhle, Richard B., Lieut.
Ulrich, Chester S., Sgt.
Vance, Kenneth M., Sgt.
Vanderneck, Richard V., T/Sgt.
Van Lear, Harry P., Jr., Lieut.
Varnado, Marvin E., Sgt.
Vaughn, Aubrey R., S/Sgt.
Verinis, James A., Lieut.
Waggoner, Wetsel O., Lieut.
Wagner, Walter A., Jr., Lieut.
Waldroup, Marvin M., Lieut.
Walker, Robert K., Lieut.
Wallace, Robert E., Sgt.
Wann, Harry A., Lieut.
(With OLC)
Ward, Arthur N., Jr., S/Sgt.
(With 2 OLC)
Ward, Grady B., Lieut.
Ware, John F., Lieut.
Warner, Harold W., S/Sgt.
Warner, James R., Maj.
Watkins, Percy B., Lieut.
Watts, Escar, Jr., Capt.
Weamer, Raymond P., Lieut.
Webb, Kenneth C., T/Sgt.
Weed, Charles H., Lieut.
Weeks, Murry E., Lieut.
Weiss, Lester, Lieut.
Welch, Edwin L., T/Sgt.
Weniger, Alfred M., M/Sgt.
Werner, Miles A., Lieut.
(With 2 OLC)
Wertz, Wayne E., Sgt.
Whito, Jack C., Lieut.
White, Thomas A., Lieut.
(With OLC)
White, Thomas R., Jr., S/Sgt.
Whitman, Jack W., S/Sgt.
Widdis, Allen E., Jr., Lieut.
Wilison, Martin E., Capt.
Wilkinson, Douglas, S/Sgt.
Wilkinson, William R., S/Sgt.
Williams, Edwin Warner, Lieut.
(With OLC)
Williams, Leon, S/Sgt.
Williams, Walter A., Lieut.
Williams, Walter M., Col.
Willis, Boyce B., Cpl.
Wilson, Nunnary, Lieut.
* Wilson, Owen T., S/Sgt.
Wilson, Ray, Jr., Lieut.
Winnfield, Robert L., Lieut.
Wintermoyer, Hugh C., T/Sgt.
(With OLC)
Winzer, Carl M., Lieut.
Witsell, Edward F., Jr., Lieut.
Wolfe, Fred J., Lieut.
Wood, Charles L., Jr., Sgt.
Wood, Robert R., S/Sgt.
(With OLC)
Woodfolk, Edmund T., Lieut.
Wright, Lee R., S/Sgt.
Wright, Robert H., S/Sgt.
Wyler, William, Maj.
Wyly, Glen R., S/Sgt.
Wynn, Walter L., S/Sgt.
Yaussi, Frank O., Lieut.
Zahos, George E., Lieut.
Zeigler, Philip R., Capt.
Zelasney, Edward J., S/Sgt.
(With 2 OLC)
Zick, Marvin O., Lieut.
Zierer, Frederick B., T/Sgt.
Zinkovich, Michael C., Lieut.

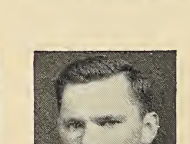
OAK LEAF CLUSTERS TO AIR MEDAL

Altman, Fredric G., Lieut. (2nd)
Alvey, Joseph R., S/Sgt. (3rd)
Anderson, Roland V. Sgt. (2nd)
Anderson, Stanley M. M., Lieut. (3rd)
Art, Robert J., Lieut. (3rd)
Bagwell, Leon L., S/Sgt. (2nd)
Balaban, John A., Lieut. (2nd)
Bishop, Warren Riley, Sgt.
Bobinski, Henry P., Sgt.
Boyd, James R., Sgt. (4th)
Browe, Robert E., Sgt.
Carlson, Francis B., Maj.
Davidson, George H., Jr., Capt.
Forrester, William H., S/Sgt.
Gibson, Roy H., S/Sgt.
* Grubb, Gerald I., T/Sgt.
McMahon, Thomas O., Sgt.
Nisbett, William L., T/Sgt.
Rumph, Ouane W., Sgt.
Shearer, John H., Sgt.
Shoemaker, William G., Lieut.
Stampley, Clarence R., Lieut.
Williams, William E., S/Sgt. ☆

Lt. Clarence H. Drake

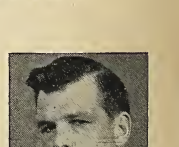
Col. Brooke E. Allen

Lt. K. L. Glassburn



Capt. Dennis Crisp

Col. W. O. Eareckson



Lt. Oren L. Jeffries

HENDERSON TOWER

The early days on Guadalcanal were like this for the men of the Army Airways Communications System.

The old tower, partially dismantled.

By Capt. J. E. ROBERTS and Staff Sgt. JOHN R. DUNN

ARMY AIRWAYS COMMUNICATIONS SYSTEM

Henderson Field on Guadalcanal isn't what it used to be. The wail of the air raid siren is more of an event now; Jap bodies no longer lie around to smell up the place. Most important of all, supplies have come in—supplies that make Henderson look like one of the many well-kept airbases in the South Pacific. Gone are such landmarks as the old Henderson control tower which weathered one Jap raid after another, its flimsy uprights battle-scarred from slugs of flying steel. A stronger, more carefully built structure has since taken its place, but the old tower might well have been called the cornerstone of Henderson Field. Its story is essentially the story of the tower operators who served during those early days. They were boys who had become men overnight—men of the Army Airways Communications System — and their story might be termed the jive translation of that official phrase, "The former enemy airfield is now in operation." This is their story.—THE EDITOR.

THE quick black of the tropic night settled down among the palm groves of Guadalcanal and a great yellow bomber's moon rose out of the quiet sea, pouring its amber light along the runway of Henderson Field, down through the tops of the swaying palms, stealing up the crude, angular lines of the control tower.

Two young men, their figures vague and shadowy in the odd half-light, leaned over the railing which enclosed the platform of the tower and peered down from their perch, now into the dispersal areas, now over the runway, now out to sea. A field telephone jangled harshly. One of the men reached out, automatically, without turning his head, and took the telephone.

"Henderson Tower."

A thin metallic warning crackled through the instrument.

"Bogies coming. Direction southeast. Stand by for Condition Red."

"Roger."

The tower operator who put down the phone was tall and stripped to the waist, and a blond fuzz struggled to form a beard on his face. He turned to his companion, and, as though picking up an interrupted conversation, said:

"All right, Dog Face, you can quit pining for Lamour. Tojo's little boys are coming over to play. On with the receiver, and let's keep posted on the slant-eyed spooks."

The other operator, small and dark, reached for his headset. A loud speaker sputtered and through it came a distinct monotone:

"One Victor Two Three calling Henderson Field."

"Sold American!" the blond boy sang out as he grabbed a mike and flipped a switch. He went on in a monotone, "Henderson to One Victor Two Three. Go ahead."

"Search flight coming to you two minutes out. Request landing instructions, please."

"Come in and circle the field. You may have to go out again; Charlie is headed down the slot. Stand by and we'll give you the dope."

"Roger."

He put the mike aside. The other boy turned to him and said, "These binocs don't help worth a damn in this light. Can't see a sign of the bogies yet."

"Can't see 'em?" shouted the blond one, snatching the binoculars from his companion's hand. "F'crissakes, who ya think you are, Superman? You couldn't see 'em in this light if they were right overhead. What's the matter with you, buckin' for Section Eight?"

"It's the sweatin' them out gives me the jitters, I guess," the dark one said quietly. "Just plain scares the hell out of me."

"You and me both. Those bombs whistlin' and crashin' around don't make like lullabies, son. A guy who says he doesn't get the shakes is a Grade-A snow artist."

The other laughed. "If every one of these raids takes a year off your life,

brother, have a look at the walkin' dead."

"Yeah, those fox-hole prayers of ours must be payin' off. Otherwise we'd be S.O.L."

The loud speaker broke in, blaring, "Bogies closing in fast from southeast. Two flights of three medium bombers each. Condition is red."

The blond, fuzzy-faced kid became all business. "Give 'em those lights," he said, jerking his head toward the field. "Hit the foxhole and leave the door open. I'll bring in this rubberneck flight and do a power dive right after you."

His companion looked at him, not moving. "Relax, junior," he said, "Let's both bring 'em in."

"OK, but you don't have to stay here on Condition Red, you know."

"Save it. Here go the lights."

The signal flare lifted and faded in the pale night, and with it came a raucous cacophony of old auto horns, gongs, clanging brake drums, and harsh voices. Over in the tent area, the lights went out as if turned off by a single switch.

Now the moon had the field to herself. The incoming search flight was overhead, its planes circling the landing strip.

On the ground, planes began warming up for the scheduled interception, their slipstreams churning great clouds of dust.

By now the Bogies were overdue.

In the tower, five speakers blared at top volume. The blond boy, his fingers clicking at switches, carried on a half dozen conversations, while his companion, pointing a directional-beam gun into the sky, signalled with green flashes to the planes coming in from the search flight.

From one speaker, "Bogies now orbiting. Direction south southeast."

Suddenly, the noise quieted down in the tower, and then from below, new noises were added to the roaring of the planes—noises from the tent area where the men were shouting, gibing, catcalling and whistling, like kids in a neighborhood movie on Saturday afternoon. Something like the kids, the men in the tent area were catcalling partly at the Japs, partly because their own movie had been called off for the raid.

The two tower operators were tense. The blond fingered the controls of the speakers, and the other played with the signal light. From time to time they grinned uneasily.

"You know," said the dark one, "This place really does have the old South Seas romantic atmosphere. At least in the moonlight it does. What a night to pitch a bit of woo . . . Anything new on the Bogies?"

"Nope. That flight of bombers we sent out early this evening is due back pretty soon or we could watch the little son-of-heaven's fireworks from the dugout."

"Yeah, from our nice, comfy little foxhole. Cozy like a sewer."

"Sewer? I've seen you whip in there, son, like it was Shangri-la. Oh, oh, there goes the searchlight over behind the mountain battery. Hear any motors?"

Soon they both could hear a peculiar, desynchronized motor sound—"Washing-machine Charlie." Then, as the noise seemed to be coming from directly overhead, six searchlights stabbed into the sky and converged on one plane high above.

"Let's see what the anti-aircraft boys can do tonight," said the blond, looking up at the plane. "Last time they had Charlie hitch-hiking to hell in nothing flat. Oh, oh. Sticks away! Hit the deck!"

As they dropped flat they could hear the shrieking whistle of the bombs, then a thudding roar as one struck, and boom, boom, as others hit. The bombs whistled and blasted, and each brief pause between sticks was filled in with echoes reverberating far out over the jungle.

The blond boy raised his head. "You know what they remind me of? A big Douglas fir being felled. You hear that wind-splitting whish speed up as the branches whip through the air, and then —boom! She hits the ground. Tim-ber-r-r-r!"

With a ba--loom that the men could feel press against them, a big one struck nearby. The tower seemed to lift, then it dropped and swayed and trembled. "Boy! That was close," said the blond, "but you see what I mean."

"Fir trees, he says. Those damned things sound to me just like a fast freight high-balling over a crossing back home in Kansas. Listen and you'll get it—that kind of trembling roar."

Another bomb hit close by.

"Bing, bam! Thank you, ma'am! That last baby jarred my bridgework. You OK?"

"Roger. Let's take a look and see if he's using his good eye tonight."

They got up and looked from the platform over the moonlit field. "Set 'em up in the other alley," said one. "He didn't even hit the hospital area this time."

"Every time we get a bombing, I hope he lays an egg near our tent. We'd sure get a swell start on a new foxhole. Save us a lot of digging."

"Boy-oy, the ack-ack boys are hotter than a two-buck pistol tonight. Look at them bounce Charlie around. See him slip that one. Bet he got a fanny full on that burst."

"You ain't beating ya gums, son. One more Charlie will miss some Geisha necking. If that hit's confirmed, it costs me just five bucks even. I bet that noisy AA corporal a fin that they wouldn't get a hit the next time they had a target. I won't even get to help drink up the fin. We won't get any beer around this place unless we make it."

A faint, imperative voice from a loudspeaker broke into their talk. "One Victor Four Three calling Henderson Tower. One Victor Four Three calling Henderson Tower. Go ahead, Henderson."

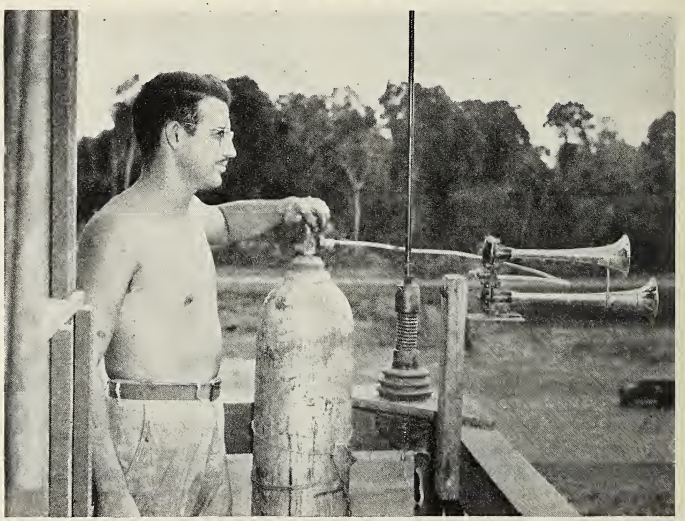
"Henderson calling One Victor Four Three. Henderson calling One Victor Four Three. You are S5, R5. Go ahead."

The light-haired kid listened awhile, and turned.

"Hey, quick, junior, alert the crash crew! Tell them to stand by for a crash landing on the strip. Get an ambulance there. Two unidentified planes, too, huh? A couple of Charlies pulling a sneak!"

The other operator dove to a phone.

This field siren was made from horns stripped off an abandoned Jap automobile.



while his companion went on talking with the men in the air.

"How much gas does your lowest plane have left?"

"Plenty. A couple of hours. How about landing instructions?"

"Hold everything. Circle the field until we identify the strangers. A P-38's going upstairs right now to look 'em over. Calling Four Victor Six Six. Calling Four Victor Six Six. Take off when ready, from the mountains to the sea."

From the P-38, "Roger, thank you."

The 38 roared down the strip, lifted and then zoomed upward, climbing almost vertically. The two men could see the strange planes, and the P-38, hanging on its props, rising toward them high in the moonlit sky. The boys listened to the pilot over the loudspeaker: "Four Victor Six Six calling Henderson. Two medium Jap bombers. And I'm right behind them, closing in now. Here we go. Tally ho."

Other planes in the air came in over the loudspeaker. "Take 'em apart, boy! Teach the little bastards to sneak in without a ticket!"

Other messages were received and the blond boy, answering one, said "Plane with wounded, land on the strip. Mountains to the sea."

"Roger; wilco."

"Which one is it this time, Gracie Allen again?"

"Nope, Butterfingers this time. She's got no more landing gear than a bathtub."

Another plane cut in over the speaker, "Tell him to stick his feet out the bomb bay and run like hell."

"Crash on the strip from the mountains to the sea. Good luck to you."

"Hate to do this. Butterfingers is gonna rip her Sunday panties. Embarrass the lady. Well, here we come."

Another speaker blared: "Six Peter One Two calling Henderson Tower."

"Henderson calling Six Peter One Two. Go ahead."

"Military transport coming in with general officers aboard. Request immediate landing instructions."

"CAN y'beat that," the operator muttered, after flipping the turn-off switch on the microphone. "Those office boys bothering us at a time like this!"

He switched back in. "Sheer off and backtrack on your course a few minutes. Then come in again for instructions. Combat traffic over field."

"Roger," came the meek reply.

Both men leaned over the railing of the control tower and watched as the plane with the wounded hit the mat. As it touched the ground with the dirt spraying up alongside it like water around a speedboat, the ambulance, crash trucks and jeeps roared across the runways. The propellers splintered into the air. The battered plane finally scraped to a halt, and before the emergency vehicles could reach it the crew members piled out.

"Guess this baby won't be a blazer, thank God! Call the strip and see what the score is."

The dark-haired operator plugged in on the command post party line, waited, then broke in: "What's the tale on those last two landings? Yeah? Swell! Nobody seriously wounded? We saw all the crew walk away from the crash. To hell with the plane—the men are safe."

Another interruption: "Six Peter One Two calling Henderson Tower. On my way back to you. Have you landing instructions for us?"

"Come in and circle the field, but don't land until you get the green light." The boy at the transmitter turned to the other: "Guess we'd better get the rest of the technical unit in first. Let the brass hats wait."

"OK, I'll green light 'em. The strip is clear now. Tell 'em to land there." He took up the signal gun, pointed it at the leading plane of the flight coming in and flashed the green landing beam. The planes came in, almost nose to rudder, swung into the taxi strip and parked in their area.

The blond young man was still complaining about the generals. "Now we can green light the big shots. With this important stuff out of the way we can roll out the red carpet for 'em, too. Too bad we don't have an eighty-piece band." He told the transport to follow the bombers in.

"Wonder how the Lightning is doing with the gate-crashing Charlies?"

AACS shower at Henderson. Re-fueling pump produces 30 lbs. water pressure in the airtight drums.

"Don't worry about that baby. Those P-38s are bad news to anyone who has the bad luck to tangle with 'em. He'll make a good Jap out of a live Jap, wait and see. I'll call the message center and find out what they've heard."

On the phone, "Hello, Harry, any message from that 38?"

"On his way in. Just talked to the AA command post and they say one of the Bogies is down in the drink. The 38 got him in two bursts. No enemy craft now, so we're waiting for 'em to declare Condition Green. Wait up! Here it comes. OK. Condition Green!"

"Thanks, boy," and the young man on the tower hung up, turned to his friend, and said, "Time for lights, bub. All clear."

HE recharged his signal pistols, and, brandishing them like a cowboy star riding into town, he shot them into the air. This time the flares were green, and they were faint in the white moonlight. Lights began to wink all over the area.

In the tower the tension was over.

"How about a coke, junior. A nice, ice-cold coke?"

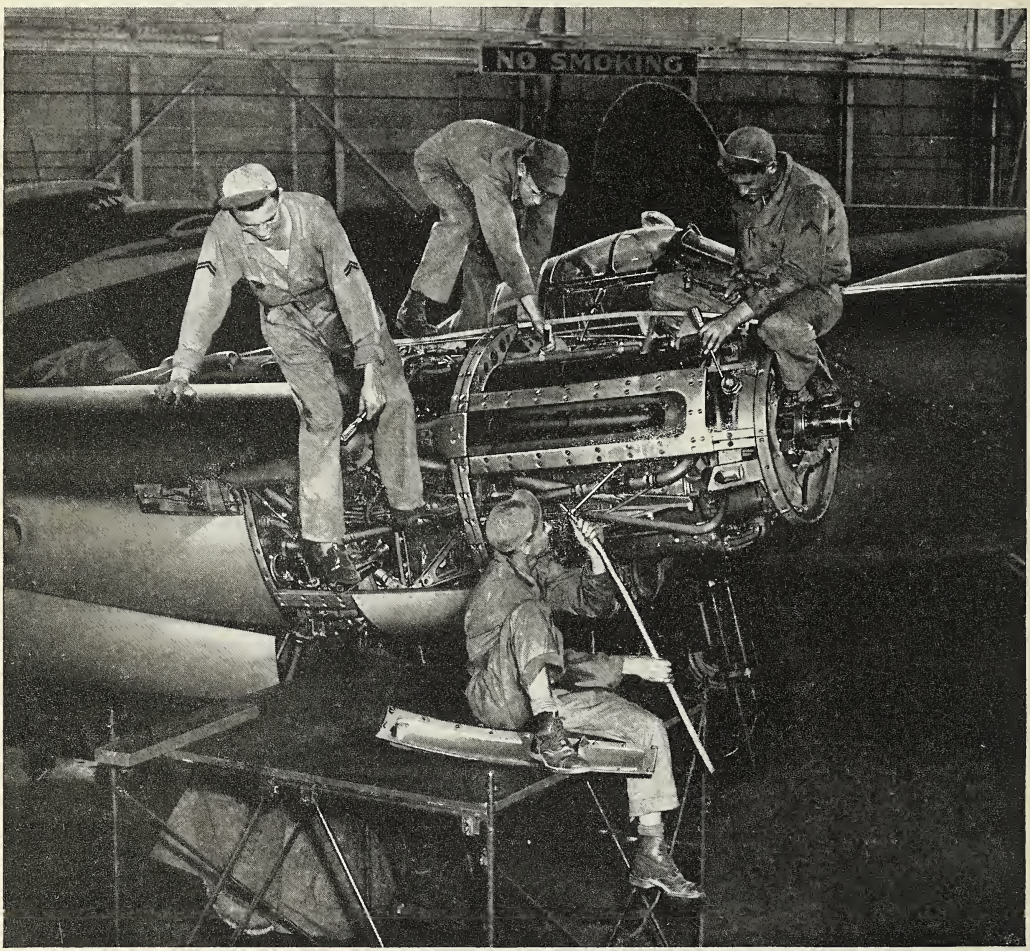
"D'ya feel all right, Daddy? I'd even settle for a warm coke!"

"You'll settle for a chlorine-cocktail and like it."

"Hey," yelled a man from the foot of the tower, "those frag bombs damn near chopped down this thing."

"Not frag bombs. The beavers did it." The dark young man tossed a canteen to his companion. "Here, have some horse medicine." ☆

ON THE LINE

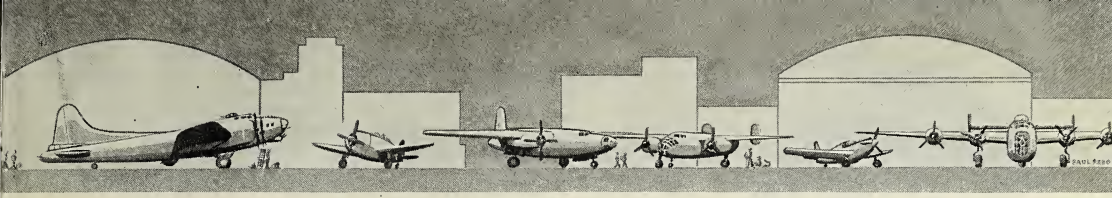


WHAT'S WRONG WITH THIS PICTURE?

Clumsy maintenance is apparent in the men swarming around this engine. It is our guess, however, that Cpl. Andrew J. Greska, on the end of the engine mount, is smiling to himself at the snafu poses. Staff Sgt. John J. Bailey, seated on the maintenance stand, also insists that he knows better. For that matter, so do Cpl. Richard L. Satterlee, on the wing, and Pvt. Vern Wickline, top center. Attached to the 88th Depot Repair Squadron at Patterson Field, Ohio, the men got quite a kick out of posing the ON THE LINE boners for December.

Sergeant Bailey can point out six boners in this picture. They are listed on Page 56. Can you find more?

Careful maintenance work—knowing the rules and following them—is just about as important as dropping bombs when the airplane is finally ready. In fact, you can't have one without the other. Watch your Ps and Qs ON THE LINE. Better yet, watch the TOs.



A MONTHLY MAINTENANCE ROUNDUP PREPARED IN COLLABORATION WITH THE AIR SERVICE COMMAND AND THE TECHNICAL INSPECTION DIVISION, OFFICE OF THE AIR INSPECTOR

Every Mechanic an Inspector . . .

Before installing a part on an airplane or engine, examine it closely for possible defects, even though the part bears a serviceable tag. Damage can occur before the part reaches you. It may have been dropped, stepped on, or it may have fallen from the parts truck enroute. What happens if you put your entire trust in the tag and install it?

Not long ago a de-icer fitting was installed on an airplane, and during inspection a tube was found flattened, closed shut and cracked at one end. Fortunately this was discovered before the ship was flight tested. Man hours were wasted, however, removing this part and installing another.

Usually caught by inspectors before the airplane leaves the shops, a defective part in many instances cannot be detected by visual inspection. Only in flight do these defects show up—then it's too late.

Another example: A vacuum pump was installed on an airplane, but the gasket did not have the hole in the proper place to permit oil to circulate from engine to pump. After the installation had been completed, the omission could not be detected by a visual inspection. The airplane was released for flight and after several hours of flying the pump went dry and the vanes froze fast to the body of the pump. Consequently the shaft snapped, causing complete failure of the vacuum system and rendered most of the flight instruments inoperative.

Men, look those parts over before you begin an installation. Examine tubing closely, so that nothing obstructs passage of various fluids. Examine parts which function mechanically for perfect condition. Consider yourself an inspector—you'll save many hours and help to eliminate crashes and forced landings.

On Servicing Airplanes . . .

It's time for a discussion of gas servicing practices ON THE LINE. Here are a few things to refresh your memory concerning this everyday routine job you mechs perform so often that now and then it is easy to get careless.

Are you connecting the static discharge clip or plug prior to putting the nozzle in the tank as outlined in TOs 12-1-10, 06-5-1 and 12-1-7? Are you making the mistake of dragging the refueling hose across de-icer boots (TO 03-35B-1)? Are you remembering to replace a worn grounding chain to the refueling unit? To insure contact over rough ground AR 850-20 requires four inches of chain to be dragging; check TO 12-1-10 also.

Is the radio or other electrical equipment in operation during refueling or cleaning? TO 01-1-1 states that no smoking, open flame or electrical devices will be permitted or operated at this period.

Are you improperly utilizing the catch on the servicing nozzle to hold the valve open when the tank is nearly full? This practice results in an overflowing tank and creates a fire hazard and a potential danger to personnel due to the gas flying up in the face of the servicing mechs.

Remember that AAF Regulation 85-6 prohibits the parking of refueling units within 100 feet of hangars. Naturally, this also means never park them *inside* the hangar. Airplanes are not to be refueled nor gas drained inside the hangar, according to this regulation.

Additional reminders: It would be well to check and see that gasoline lines and packing joints are being maintained properly. Particularly is trouble encountered in the packing joint where the fuel line enters the hose reel. Concerning this, brush up on TO 19-25 series.

Fill 'Em Up . . .

Oxygen cylinders now being installed in combat aircraft are non-shatterable and are intended to be filled to at least 400 pounds pressure. Actually, they should be filled to 425 pounds to allow for a slight drop in pressure which occurs when they cool. Refer to TO 03-50-1.

Smooth (unbanded) cylinders, with the exception of type H-1 bail out cylinder and type A-2 portable cylinder, are not shatterproof and should not be filled to more than 300 pounds in combat areas in accordance with TO 03-50-9.

Watch the Welds . . .

Mechs, you may prevent a fire in the plane you're working on by checking carefully for cracks in sections of fuel lines, fuel vents and drain lines which have been welded. If you find a leak and repair it before the crack has grown larger and becomes a fire hazard, you have gone a long way toward saving a crew and plane.

A Good Motto . . .

A plane is no better than the mechanic who services it.

Bird in the Hand . . .

A new TO, "Handling and Releasing Homing Pigeons from Aircraft in Flight," is beamed particularly to flying personnel, but it also has definite interest for ground crewmen as well. If a plane equipped with pigeons runs into trouble, the TO (01-1-120) tells flyers how to get the birds out of the plane safely and with messages properly attached. Pigeons are almost infallible, but they do get thirsty and hungry so one might drop by your hutch looking for a handout.

If you know how to catch him, you may be able to speed the message to proper authority. Water is the best bet since after flight that is the first thing on the pigeon's mind. Food comes second. If these baits fail, shoot him. If you can

get your hands on him alive, do so by grasping the bird over the outer flight (wing) feathers far enough forward so that your thumb and first finger are placed to hold his legs still. Captured that way he'll live to fly again. If shot, consider him as emergency rations.

Every army uses pigeons. If flying purposefully, they are best left alone. If wandering aimlessly, resting or injured, they should be captured. You may intercept vital news from the opposition. ☆

By Dr. S. M. Burka
MATERIEL COMMAND

THE mystery which has apparently developed concerning so-called "black light" and the phenomenon of luminescence calls for some clarification.

Electromagnetic waves, like water waves, run the gamut from ripples to ocean rollers. The ripples measure one ten-billionth of an inch from crest to crest, the rollers hundreds of feet.

The shorter of these waves we call X-rays and the longer, radio waves. Out of this tremendous group one tiny octave, sixteen millionths of an inch to thirty millionths of an inch, from crest to crest, affects the eye as light. The shortest visible waves produce the sensation of violet and longer ones, in order, blue, then green, yellow, orange and red.

The combination of all the visible waves produces the sensation we call white. We see objects, except self-luminous ones, by the light reflected from them, and their colors are determined by the wave lengths they reflect. If they reflect all wave lengths they will appear white when illuminated by white light, and black if they reflect none. A white object therefore will appear green if illuminated by green light and red if a red light is employed. A green object appears green to white light because it reflects only green light and not blue or red, and it will appear green if green light falls on it. If red light is used to illuminate a green object, it will appear black because the object does not reflect red light.

Waves too long to affect the eye are called infra-red, while those too short to affect the eye are called ultra-violet. Because ultra-violet waves behave like ordinary light, but cannot be seen, they have been given the popular name of black light.

The reaction of certain substances to ultra-violet rays forms the basis of AAF cockpit lighting systems. Such substances absorb the ultra-violet which falls on them and re-emit the absorbed energy as light of longer wave length. Since wave lengths longer than that of ultra-violet affect the eye, they are visible and we have the remarkable effect of seeing objects illuminated by invisible light.

This property, commonly called fluorescence, is present to some degree in a large number of substances. Varnish, paper, the skin, finger nails, the teeth (except false teeth) and the lens of the eye, all glow when "lighted" by ultra-violet light. But in addition to these, many dyes and minerals fluoresce very strongly. These materials are called "luminescent." *Luminous* materials are those which generate their own light energy, while the *luminescent* ones require activation by external energy sources.

Luminescent materials are divided into two classes. Those which cease emitting light when the activation stops are called fluorescent. They black out as soon as the ultra-violet lamp is turned off. Materials of the second class, called phosphorescent, store up energy and continue to emit light for a limited time after the activation ceases. Some phosphorescent compounds continue to glow for six or eight hours after external activation has ceased.

Although fluorescent light emitted is always of longer wave length than that of the exciting radiation, it bears no relation to the color of the materials as seen in daylight. As a consequence, we have pigments, white or yellow in daylight, which shine with blue, green, yellow or red light under the ultra-violet lamp.

Radium salts also cause fluorescence so that if traces of radium should be incorporated in the pigment, the glow will continue indefinitely. Under the ultra-violet lamp this type of pigment shines brightly, but when the lamp is turned off the glow decreases immediately if fluorescent, or slowly if phosphorescent, until the level determined by the amount of radium is reached. This level of brightness is then maintained indefinitely, and the material never completely blacks out.

The system of ultra-violet lighting permits extreme flexibility and control of cockpit lighting. The cockpit can be flooded with black light yet nothing will be visible except those parts deliberately intended to be seen. The lamp itself, the panels, the instrument faces, labels, knobs and brackets all remain invisible. Only the dial graduations, the instrument pointers, essential labels or other parts marked with luminiscent pigments appear—in any color desired, regardless of their daylight color.

If fluorescent materials are used, perfect control over the brightness can be exercised. When the lamp is turned down the brightness of the markings decreases, and when the lamp is turned off the markings disappear instantly. If some critical markings must be visible at all times, radium is added to the pigment used and, when the lamp is turned off, these particular markings will drop to the low light level desired, remaining at that level indefinitely.

AT present, AAF cockpit instruments are marked with a green luminescent-phosphorescent material because, at the time ultra-violet lighting was adopted, this was the only stable material available. Since the material is phosphorescent it does not respond immediately to changes in intensity of the lamp but lags several minutes behind. Then, if the lamp is extinguished, it will continue to glow for an hour or more. This glow is *not* due to radium content. In fact, only about six of the instrument types have any radium and this small amount is on only a few critical graduations of the basic flight instruments. To perceive any difference, it is necessary to keep the instrument in total darkness for an hour or more. By this time the phosphorescence will have died out and the radium activated marks will be the only ones remaining visible. The radium brightness is at a very low level and it is necessary for the observer to keep his eyes in darkness for at least a quarter of an hour before he can see the markings.

It has long been known that if the eyes are kept in darkness for a half hour or more they become enormously sensitive to faint light. This process is known as dark adaptation. If one looks at a bright light after dark adaptation the dark sensitivity will be lost and another period of darkness will be required to restore it. Naturally the brighter the light the more complete will be the loss of dark adaptation, but a very interesting fact has been noted in this connection: The shorter visible wave lengths are more effective in this spoilage than the longer ones. A blue light will ruin this dark adaptation as quickly as a white light of the same brightness, but a deep red light will have considerably less effect. A red flashlight or red floodlight bright enough to permit reading may be used safely without serious effect on dark-adapted eyes, whereas a white, blue or green light of the same brightness may com-

An explanation of luminescence and how it is being used for night-lighting cockpit instrument panels.

pletely nullify the sensitivity acquired in the adaptation period.

Since the dark-adapted eye is extremely sensitive, a four watt bulb will provide ample illumination. The bulb, which emits visible as well as ultra-violet light, is enclosed in a housing with a glass window designed to filter out all visible light while permitting passage of ultra-violet rays. Actually this glass transmits a little blue and a little red so that a faint purple light is seen if one looks directly into the lamp. At the same time a white fog appears due to the fact that the eye itself fluoresces and the interior of the eye therefore lights up. This fog decreases the ability of the eye to see outside objects so care must be taken in placing the light mounting to prevent any direct ultra-violet light from falling on the eyes.

Now that stable fluorescent materials have been developed, advantage will be taken of these facts in modifying cockpit lighting systems. Since we desire complete control of brightness, luminescent-fluorescent materials are to be used. Then if the lamp is dimmed the dials will dim correspondingly. When the lamp is turned off the cockpit blacks out instantly. Except for night fighters, a few essential flight instruments will have markings in radium-activated fluorescent material. These marks will continue to glow at a very low level, but which will be readily visible to the dark-adapted eye.

Since either red or ultra-violet illumination is to be used (red because it does not spoil the dark adaptation), the reflection color (i.e., color to daylight) will be nearly white. In order to preserve further the dark adaptation, the fluorescent color is to be orange instead of the present green.

The number of graduation markings will be decreased to the minimum necessary, but additional graduations to those necessary for flight will be required for purposes of calibration, testing and the like. Their markings will be in a green non-luminescent material. The non-luminescent material is invisible under ultra-violet light and being green will be invisible also under red flood lighting.

The new dials therefore will show only the minimum markings when used at night, but by daylight will give all the data required. ☆

In Summary

Black Light—the invisible rays that light up instrument dials in a cockpit—is one of the common phenomena of electromagnetic waves that is difficult to understand principally because it cannot be seen.

Its use in airplanes is essential to protect the night vision of pilots and to keep the cockpit dark, thereby preventing disclosure of the plane's presence and position to enemy aircraft.

Present instrument dials emit a pale greenish light reflection which continues to glow after all light sources have been eliminated. Discovery of a new stable luminiscent material that is fluorescent but not phosphorescent now enables instantaneous blackout of all dials. This material, developed to emit an orange reflection as further protection for the pilot's night vision, is being applied to all new instruments as rapidly as manufacturers can change over.

TECHNICAL

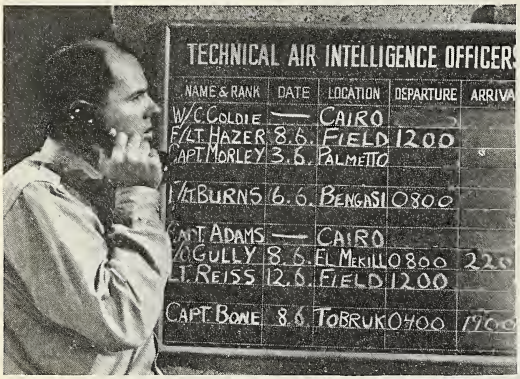
MOVIE REVIEW

IN the inspection of enemy equipment, the discovery of some small detail may lead to a revision of tactics and a more successful operation against similar equipment in combat.

This is the theme of a new training film (TF 1-869) "Technical Intelligence, Inspection of Enemy Materiel," produced by the AAF First Motion Picture Unit in Culver City, Calif. The story concerns the inspection of a wrecked German ME-110 and the resulting discovery of a vulnerable spot in the plane's construction.

1—The scene opens with a group of intelligence officers discussing the ME-110 and expressing the desirability of gaining access to one of the planes reasonably intact to determine its operational characteristics.

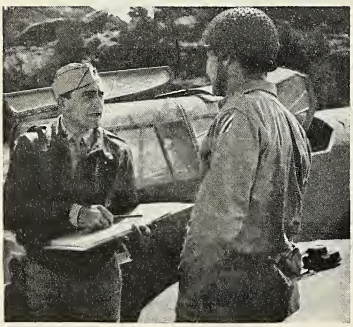
2—Meanwhile, in the African theatre, a P-40 pilot reports that he has shot down an ME-110 and that the plane appears to be salvageable. The intelligence officer calls Base A-2.



3—A-2 checks the assignment board and puts a crash-officer, Captain Morley, on the inquiry. Captain Morley departs immediately for the crash scene.

5—After a preliminary examination of the wreck, Captain Morley snaps photos of the plane from all angles for the intelligence records.

4—On reaching the plane, Morley jots down notes as he talks with Lieutenant Haines, in charge of the guard placed over the wrecked fighter.



INTELLIGENCE

6—Captain Morley's problem is to discover why the plane went down. He examines the instruments and finds them in proper working order.

7—He then discovers that someone has removed a nome plote. When the lieutenant asks why it is so important, Captain Marley explains that every part has a stary ta tell and sa is af value. Lieutenant Haines hands aver the name plate which he had taken os o sauvenir.

8—Captain Marley sees o guard flicking oshes into o rounded fragment af metal. Other similar fragments were picked up, and it is faund thot the explasion of oxygen equipment coused the fighter to crash.

9—The conclusions were verified ot Moteriel Command headquarters, Wright Field, where the plone loter wos taken far further study.

10—The scene shifts back ta Narth Africa where a squadran cammander applies the lessans learned in the investigatian and instructs his pilots in methods af attacking the ME-110 as a result of the findings.

AAF FIRST MOTION PICTURE UNIT
Culver City, California

WHAT THEY'RE READING

A COMPREHENSIVE manual, "The Air Force in Theatres of Operations—Organization and Functions," is being distributed to AAF organizations by the Chief of Management Control, under whose direction it was prepared.

The complete manual consists of 27 chapters, each dealing with some particular phase of Air Force organization or activity. These are combined into six separate booklets which, together, cover the organization, mission and operation of the Army Air Forces; the mission and organization of fighter, bomber, air support and air service commands; the duties and responsibilities of general and special staff sections, and the duties of squadron officers.

Chapter 27 (Booklet VI) of the manual is being reprinted separately, for squadron distribution. This chapter deals specifically with squadron mission and organization, squadron management and duties of squadron officers.

YOUR BODY IN FLIGHT. "Your Body in Flight," prepared by the aero-medical laboratory at Wright Field and published as Technical Order No. 00-25-13, tells in simple cartoons and accompanying text exactly what happens to the human body when flying in an airplane. Every physiological subject is covered, including high altitude, blackout bends, night vision, first aid in the air, and so on. The main purpose of the publication is to enable flyers to understand thoroughly the physiological problems they face on a mission.

OXYGEN EQUIPMENT. Revised Technical Order No. 03-50-1, "Use of Oxygen and Oxygen Equipment," contains comprehensive instructions and many new items which should prove valuable to high-altitude airmen.

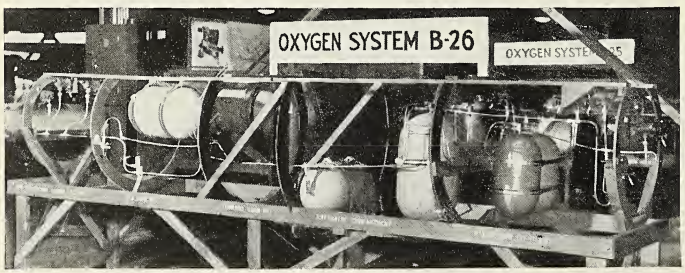
RECOGNITION. To aid in recognition of planes, ships and tanks, the Army and Navy are publishing a new monthly magazine, "U. S. Army-Navy Journal of Recognition." Widely distributed throughout the AAF, it supplements other recognition material.

In addition to publishing latest recognition developments, the magazine contains changes in equipment and methods, both our own and the enemy's.

NOTES ON AIR GUNNERY AND AIR FIGHTING. The Training Aids Division has reproduced a booklet entitled "Notes on Air Gunnery and Air Fighting" by Group Captain E. M. Donaldson, one of the RAF's most experienced fighter pilots. Because it summarizes the lessons which he and others have learned from actual combat, it should be helpful to pilots, pilot trainees and instructors.

INSTRUMENT FLIGHT. The important subjects of instrument flight and radio navigation are covered in a two-volume publication of the Navy's Bureau of Aeronautics, Training Division. Part I, dealing with Instrument Flight, is a straight Navy publication, enlivened with illustrations by the same artist whose work brightens the pages of the Navy "Sense" publication. Part Two, dealing with Radio Navigation for Pilots, is a special Navy edition of a book of Colin H. McIntosh, assistant superintendent of flying school operations, Military Division, American Airlines.

OXYGEN SYSTEM MOCKUP. A schematic model of an aircraft oxygen system (below) is now in use at Sheppard Field, Texas, for the training of maintenance crews in the proper servicing of oxygen cylinders, regulators, valves, lines and fittings. The device was designed and produced at Sheppard Field.



AIR POSTERS IN PORTFOLIO. There is a growing demand in the Army Air Forces for training posters, especially for poster series bound in portfolio form for classroom instruction.

The Training Aids Division has prepared a number of poster series bound in portfolio form. A lightweight binder serves as a container for shipping or carrying and as an easel for classroom use.

The poster illustrations and text matter cover the high points of courses of instruction for which they were designed. Drawings or photographs appear on the face of the sheet and on the back of the preceding sheet appropriate lecture notes are provided for the instructor.

The standard binder is made of die-cut cardboard, covered with olive drab slick paper stock. A handle is provided for the instructor's convenience. Like the poster sheets, the binder comes in two sizes:

Air poster portfolio.

30 by 40 inches and 22 by 32 inches.

The portfolio can be used anywhere—in the classroom, in the field, or under the shade of a tree or airplane wing.

In addition to the development of the poster series, AFTAD is canvassing all poster sources—military and commercial—to compile a catalog of training material which is available for distribution to AAF training activities.

Manufacturers of AAF equipment are cooperating with the training program by preparing and issuing air posters suitable for classroom use. Before the posters are issued, they are submitted to AFTAD for approval and for a determination of the requirements of AAF training stations. ☆

WHERE TO GO

Information on the availability of training films and film strips, aircroft recognition materials, synthetic training devices and training literature may be obtained from the Training Aids Division, Army Air Forces, Park Avenue and 32nd Street, New York, N. Y.

...BEEN HITTING THE BOTTLE?

No, worse luck, he hasn't! (Meaning the oxygen bottle, of course.)

If he had, he wouldn't be cutting up and behaving like a rummy at 15,000 feet. His is a beautiful case of anoxia (lack of oxygen) and it's playing hell with his sense of proportion—all because he is a wise guy and won't use his oxygen.

He has false feeling of exhilaration and self-confidence (one of the usual anoxia symptoms)..

He thinks he's OK. But that's how anoxia works. You begin losing efficiency at 10,000 feet; as you go higher your physical and mental functions become more impaired, and sooner or later you pass out completely.

So instead of getting ossified in the rarefied, be sure your oxygen equipment is functioning properly—and USE it above 10,000 feet. This will guarantee the clear head and steady hand necessary to shoot down the Nazi in the manner to which we would have him become accustomed.

(Fourth in a series by the Office of Flying Safety, formerly the Flight Control Command.)

Operation of Air Filters

By Wayne D. Cannon

WRIGHT AERONAUTICAL CORP.

EFFICIENT as they are, modern aircraft engines cannot digest sand.

The Germans found that out in Africa. So did the British and Americans. In fact, both sides discovered that it was possible for a new engine, ordinarily good for thousands of hours, to pick up so much sand on a single flight that piston ring wear would exhaust the oil supply and the plane would have to be abandoned behind enemy lines.

In this country, dust arising from training fields newly plowed out of the plains of the southwest has likewise emphasized the need for adequate air filter protection.

Air filters for aircraft engines were designed over twenty years ago, but the type of flying in the years of peace was such that engine wear from dust was not a particularly serious problem. Planes for the most part operated from airports with paved runways and sodded fields, while even on maneuvers the dust from temporary airfields did not affect a sufficiently large volume of planes to warrant installation changes.

In operations today, however, air filters are a necessity. Without adequate air filter protection, excessive engine wear makes it necessary to overhaul and rebuild engines at frequent intervals, increasing the use of maintenance workers and spare parts in areas where both are likely to be scarce. Even more important is the production problem, for an engine saved for further flight is the equivalent of an extra engine produced on an assembly line.

A great deal of research and experiment has been conducted on air filters in the last twenty years, particularly on air-conditioning equipment for offices, stores, theaters and factories. Filters also have been designed for farm equipment—a "must" out in the dust bowl regions—and for large stationary engines. Three general types are in use, although there are many others in existence, and one of these three has been found adaptable for use in aircraft engines.

One type is the oil bath filter, in which the intake air stream is directed against a tank of oil at the bottom of a U-shaped passage. The air stream bounces off the surface of the oil, while the dust and sand is retained. Although efficient, this type of filter cannot be used in aircraft, for the first bank or any other change of position from horizontal flight would cause the oil to spill over and slosh through the intake passage. In addition, this type of filter is extremely heavy for aircraft use.

A second variation is the dry-type filter, quite frequently used in air-conditioning systems, where size is not an acute problem and where air velocity is low. Felt, fabric or heavy layers of mesh or gauze are used as the filter media. These filter materials offer high resistance to the airflow and the resistance increases as dust is accumulated on the material. In addition, they are inflammable and require frequent replacement. They have a further disadvantage for aircraft use in that if they become damp, through storage in a damp place, or if they become wet during flight through a rain storm, the clay in the dust forms a mud pack over the filter, severely restricting the flow of air.

The third type of filter, the one now in most common use on American aircraft, utilizes a viscous impingement filter element. Briefly, these filters consist of knit wire or knit metal ribbon sheets suitably crimped and packed into durable metal frames. The mesh of the sheets is varied, becoming progressively smaller from the front, or intake, side of the filter to the rear side. The layers are supported in the frame with sufficient structural strength to withstand engine backfire pressure without damage.

Before use, the filter is dipped in engine lubricating oil and allowed to drain before it is installed in the induction system. The mesh of the dural sheets mechanically separates the particles of dust from the air stream and then the oil entraps and holds the particles. The filter element is installed in such a manner that it can be easily removed. Then it is cleaned in gasoline, dipped in oil and is ready for service again.

Viscous impingement filters, when properly made, are capable of removing a minimum of ninety percent of the sand from the air when the air velocity is 1,000 fpm without imposing a pressure drop of more than four inches of water. Filters having this performance can be built in a wide variety of shapes to fit the installation requirements, although flat surfaces are more easily manufactured. The thickness of the element is usually two inches.

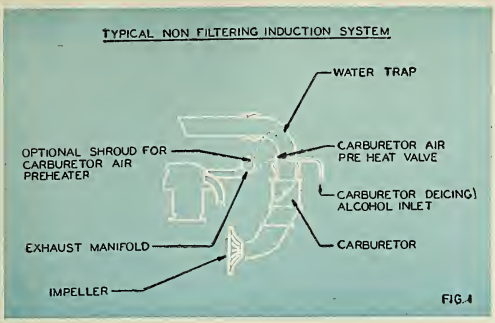
No attempt has been made to standardize the dimensions of a filter element because the configuration of airscoops varies with the design of the airplane, and therefore the shape of the filter has been left flexible so that installation designers will have as much leeway as possible.

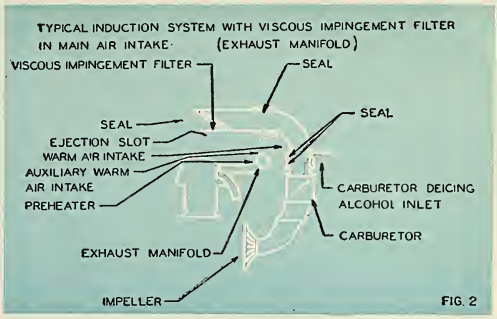
Even though the design treatment of an induction system varies widely from one airplane to another, certain parts are common to them all, as shown diagrammatically in Figure 1.

There are several ways in which the conventional induction system can be altered to accommodate a filter element. Figure 2 illustrates diagrammatically one way in which a conventional induction system can be changed to accommodate an air filter.

Note first that the filter is disposed so that it can be easily removed for cleaning. Ease of servicing is of great importance. It is usually necessary to position the filter at an angle to get an element of sufficient area into the scoop.

Just ahead of the filter element are ejection slots which bleed off some air which carries away the dirt and free water





that settles in the airscoop or is deflected by the filter element. These slots should be located with respect to pressures inside and outside the scoop so that the airflow will always be in the proper direction.

These slots replace the water trap shown on the previous system, since it is of utmost importance that the induction system be thoroughly sealed to prevent sand by-passing the filter, as would be the case if the water trap were not omitted.

In this connection, it can be pointed out that seals are shown around the filter element, at all joints, and at the alternate air intake.

The rest of the system is the same as a non-filtering installation with one exception. That is the treatment of the alternate air intake and carburetor air preheater.

In Figure 2 the solid lines represent the alternate air intake which takes warm air from the rear of the engine. The dotted lines indicate a shrouded exhaust manifold which picks up and preheats the carburetor air before it enters the induction system. This system may produce very high carburetor air temperatures if there is not an admixture of cold air through the main air intake. For this reason another valve can be added, which will be referred to as the auxiliary warm-air valve. This valve can be rigged to a single preheat control in the cockpit, so that for the first portion of the cockpit control travel the auxiliary warm-air valve remains fully open and does not start to close until the admission valve in the air-scoop is fully open. As the cockpit control is moved further toward the full-hot position, the auxiliary warm-air valve closes to give the pilot full use of the preheater.

This method of operating the preheat system adds no duties to the pilot and yet gives him an induction system suitable for flying in all kinds of weather.

This additional warm-air valve may appear to be an unnecessary refinement. It has been used on commercial airplanes for many years and is only new in its application to a filter installation. It is important, however, since it is conceivable that a ship with a filter installed in the airscoop may climb through a snow storm and have the filter completely blanked off and come out into sub-freezing temperatures that will not clear the filter. If, under these conditions, full power was required, the engine could best be served if the carburetor air temperatures could be held within reasonable limits. This auxiliary warm-air valve in the preheat system takes care of such an emergency.

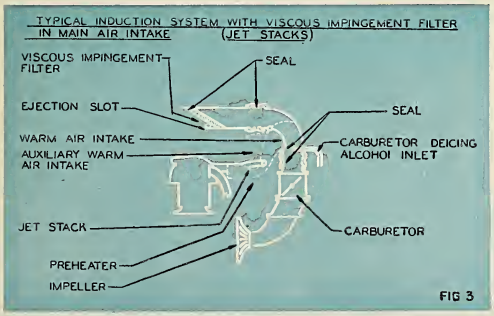
The entire alternate air intake system is used only in emergencies, and it has been found that sand is usually not present in damaging quantities in atmospheric conditions that require the use of the alternate air intake.

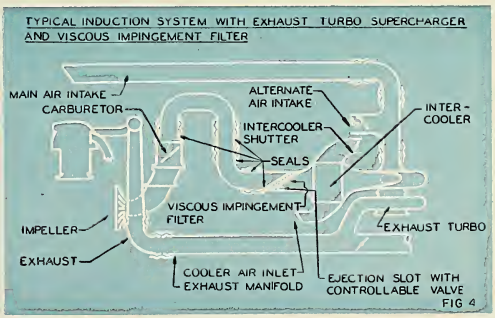
Figure 3 is similar to Figure 2, except that it illustrates a jet-stack installation in place of a manifold type of exhaust system.

Figure 4 illustrates one type of filter installation in an induction system employing a turbo supercharger. Note that the filter is located on the pressure side of the turbo compressor after the intercoolers. This location was selected as the point that will produce the least effect on the performance of the supercharger. The filter is located after the intercoolers for two reasons: first, so that heat control can be accomplished with the intercooler shutters and, secondly, so that the normal flow of air through the viscous impingement element will be at a reasonable temperature.

In a turbo installation there is some advantage at high altitude in being able to stop bleeding air out of the induction system on the pressure side of the turbo supercharger, and for this reason the diagram indicates controllable flaps at the ejection slots.

The diagrammatic installations shown are believed to give the engine the protection it needs against damage by sand, with the least complication and least added weight to the airplane, without upsetting the carburetor metering, and without imposing any responsibility or added duties on the pilot or flight engineer.





TECHNIQUE

(Continued)

Production Line Maintenance

One completely rebuilt aircraft engine every 45 minutes is the pace being set by ASC's model depot at Tinker Field, Oklahoma City.

Although not a manufacturer, this depot has perfected a system of production line maintenance that resembles those of pre-war automobile plants. Other ASC depots are adopting similar systems in their intensive drive to keep all our planes flying. Perfection of course is impossible but the OCAD, commanded by Brig. Gen. Arthur W. Vanaman, has reduced the number of grounded planes to less than ten percent of the thousands in its extensive service area and has the best record among ASC depots.

One of the chief reasons for this record is the rapid engine overhaul system being carried out under Col. Leslie G. Mulzer, veteran command pilot and chief of the engineering department.

The scarcity of trained mechanics was the original stumbling block in expediting the overhaul of intricate aircraft engines. The problem was solved by instituting training programs on specialized jobs in which individuals are instructed in one or two essential operations such as tightening bolts or inserting rods. After a trainee has acquired speed and skill, he is assigned to the assembly line where he performs continually this one specialized operation.

The assembly line system of overhauling and repairing aircraft equipment was not applied fully to air force installations until the shortage of skilled mechs made it impossible for crews to overhaul complete engines themselves. Now the engine shell moves through the line in eight hours.

Within this time the engine is removed from a plane and delivered to the engine repair section's dismantling department. Utilizing the scientific "magnaflux" X-ray process of analyzing wear, fatigue, breaks or irregularities in every piece of metal, each part of the engine is tested, inspected and if found in proper condition, forwarded to the "parts pool." Imperfect parts are either salvaged or reconditioned and returned to the pool, the depository for all engine parts except closely integrated units such as gear trains and fitted units which are tagged together.

Because tolerances are so close and inspections so thorough, every part is interchangeable. When an engine is rebuilt it may contain parts from as many as thirty different engines yet operate as efficiently as a new one.

Along the re-assembly line are work benches with small stocks of parts for each station's operation. Above each bench is a red light that is flashed on when the supply of parts at that station is running low. A stock tracer immediately checks the station number and draws from the parts pool to replenish the supply at that bench, keeping the line flowing.

Engines are torn down, get steam bath before "Magnaflux" testing.

When completely reassembled, the engine is put through a test run under simulated temperature extremes. If found satisfactory, it is then released for installation.

New tools and new methods are constantly being adopted to expedite the process and assure uniformity. These include a special nut tightener operated on the electric drill principle, with special adjustments equalizing the tension so all nuts are tightened to the same pressure.

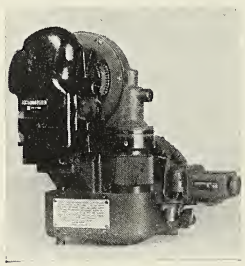
The depot's engineering division also has extended its production line methods to such items as instruments, spark plugs, generators, starters and magnetos, and through its specialized training program has been able to step up its rate of instrument repair and overhaul to about 8,000 per month.

Additional evidence of the success of the system are these monthly output figures: spark plugs, 80,000; magnetos, 1,300; starters, 450, and generators, 300—all completely rebuilt. Many of these units are installed in the more than 100 aircraft which are completely reconditioned each month at OCAD. The remainder are shipped to sub-depots in the service area and to overseas centers. **— Capt. Robert V. Guelich.**

A New Aid to Navigators

An averaging sextant has been designed to increase accuracy and relieve the navigator of the excessive mental and physical fatigue connected with computing averages arithmetically or with using earlier and simpler types of averagers.

The new instrument is an ordinary AAF type sextant with an automatic averaging device attached. This device is merely a chronometric or clock type instrument which is simple in operation and requires very little effort from the navigator using it. Conservation of effort is very important to navigators working long flights at high altitudes in more or less uncomfortable surroundings and distractions. Navigators find that they are prone to make many mistakes in the simplest kinds of computations when working under such unfavorable conditions. Only navigators who have had to rely on the older methods of averaging their celestial shots can appreciate the advantages of the chronometric integrator or averager.



New averaging sextant.

It is quite well established that accuracy of celestial observation is greatly increased by this type of device which automatically averages some 100 shots in two minutes of observation, thereby virtually eliminating chance error due to small speed changes, vibration and rough air. The shots are taken at a uniform rate of one every two seconds. Principal factors contributing to better accuracy in celestial observations are:

1. Decrease of fatigue and human error.
2. Ability to average a greater number of shots in one observation.
3. Assurance of uniform spacing of shots.
4. Freedom of the navigator to concentrate on keeping collimation between the bubble horizon and the body being observed.

Operation of the averager is simple and straight-forward. The navigator winds the clock apparatus prior to taking the observation. He then sights the sextant in the usual manner at the celestial body to be observed. When he has the bubble horizon and body in or near coincidence, he flips a lever which locks the averaging device at a zero or reference point. The instrument is now set up for making the observation. When the navigator gets the star and bubble in coincidence, he presses a button which starts the chronometic device averaging plus and minus from the zero or reference point. He now has only to hold the star and bubble in coincidence until the two-minute period is completed at which time a dark shutter obliterates the field of view. The navigator may then read the average altitude of observation direct on a Veeder-type counter on the side of the averager. **— Prepared by the Materiel Command Equipment Laboratory, Wright Field.**

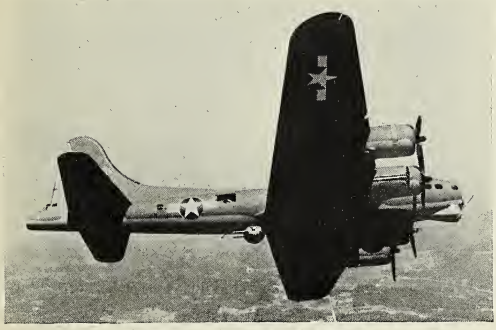
Introducing the B-17G

The B-17G, incorporating a number of new features, is now in production.

The most noticeable change in the Fortress' external appearance is the addition of a chin turret. A twin .50 caliber unit, the turret is located directly under the bombardier's compartment. It is electric-powered and the two M-2 machine guns are equipped with recoil absorbing mechanism, firing solenoids and hydraulic gun chargers. The guns have an effective range of about 1,000 yards.

A controller, which when stowed rests against the right side of the fuselage, regulates the chin turret movement. It is unlatched and swung to a convenient height before operation.

The sight, synchronized with the movements of the gun in azimuth and elevation, is driven by tachometer shafts from the azimuth and elevation gear trains. Thus the gunner's vision always takes in the direction in which the guns are pointing and moves with them. A rheostat controls the intensity of the light focused on the concentric circles projected on the sight glass. These circles and their center are employed like the ring sight and dot on a flexible gun installation. The gunner must estimate all incurred corrections after observing the projectory of tracer bullets. In order to permit flow to the guns while



The Fort now has a chin that stings.

the turret is in motion, ammunition is held in two metal containers fixed to the movable turret housing.

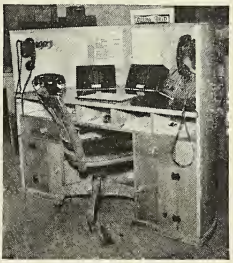
Another minor change in external appearance of the bomber is effected by the removal of the two B-17F pitot-static masts on each side of the nose and the installation of a single pitot mast just below the body centerline. Flush-mounted static fittings are placed on each side of the body just above the front edge of the forward entrance door. The radio compass loop has also been moved to a point just ahead of the bomb bay doors and slightly to the left of the body centerline.

The navigator's compartment has been worked over and a larger table and a swivel chain installed. The gyro flux gate compass and radio compass have been rearranged and a shelf provided over the table. A step is added beneath the astrodome to facilitate taking sights. Interphones, jack boxes and heated suit rheostats have been relocated.

An entirely new cable-operated bomb control system is a feature of the B-17G, eliminating the push-pull rod control and embodying a new bomb control handle assembly and a gear type coordinating unit. The three outstanding improvements and advantages gained are: (1) The bomb doors can be closed from the bombardier's station after the emergency release is pulled. (2) In addition to the mechanical interlock, the bomb door actuating switch handle is located so as to interfere with any attempt to move the internal bomb control handle to select without first opening the bomb doors. (3) The release of the external bombs can take place without affecting the internal racks or the bomb doors.

Handy Flight Control Desk

Capt. Herbert Bernenko, base operations officer at Kellogg Field, Mich., has designed a functional desk in an effort to eliminate the usual disorder that comes from keeping flight control equipment on an ordinary table and to give the clerk privacy needed for his work. The desk was built by woodworkers at the base sub-depot.



Everything within reach.

It is semi-circular with a curved board rising from the outer edge to screen the clerk. The interphones are suspended from either end of the board and within easy reach. Maps and rules of procedure are affixed to the inside. Telephone, interphone speakers and teletalk equipment are aligned along the rim of the desk, with plenty of space left for log sheet and scratch pad.

Open compartments, built in directly under the desk top, and drawers and cupboards on the right and left provide handy space for storing equipment and forms. All wires run under the floor to the desk, giving the clerk free access to the status boards. — **Public Relations Office, Kellogg Field.**

Self-Powered Airplane Starter

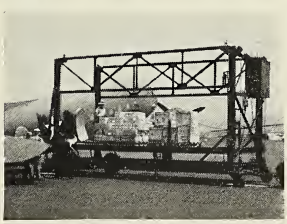
A portable self-powered generator unit built from obsolete spare parts, scrap iron and other salvage materials now is used to start most of the planes at Chanute Field, Ill., replacing the usual battery cart. The unit was designed and constructed by Tech. Sgt. Robert Mercer from an idea suggested by Maj. Howell G. Crank, post operations officer.

Power for the generator is supplied by a 2-cylinder, 13½-horsepower gas engine, originally designed for use as an auxiliary to generate electric current in obsolete planes. The entire unit is mounted on three wheels for easy movement. Connection to the plane is made by a thirty-foot insulated cable. Two two-gallon tanks supply engine fuel. Control panel instruments and controls include a fuel pressure and oil pressure gauge, ammeter, voltmeter, throttle, generator, and starting and ignition switches.

Generating 24 volts, the unit can be used on most types of military aircraft. — **Public Relations Office, Chanute Field.**

Mobile Elevator for Loading Planes

A mobile elevator by which planes are loaded from a roller-conveyor is facilitating the handling of air cargo by the 39th Air Freight Wing Detachment at the Newark (N. J.) Army Air Base. It was developed by Capt. Julian A. Devereaux, CO of the detachment, Phillip A. Cosgriff, general superintendent, and the Mercer Engineering Co., New York City.



Handles five tons.

In use since midsummer, the elevator is adjustable to heights from 12 to 22 feet, sufficient to accommodate the largest plane. It has a platform 8 by 22 feet, a 10,000-pound capacity, and is powered by a five-horsepower electric motor.

Also useful in loading and unloading operations at the air freight warehouses, the elevator is moved by regular small tow-tractors. — **Capt. Arthur J. Lonergan, PRO.** ☆

First Sergeant Cathey's squadron has been alerted, and like a mother hen protecting her brood from the approaching storm, the good sergeant is checking with the unit personnel office and the supply sergeant to bring up to date each man's service record, clothing record and forms 20, 31 and so forth.

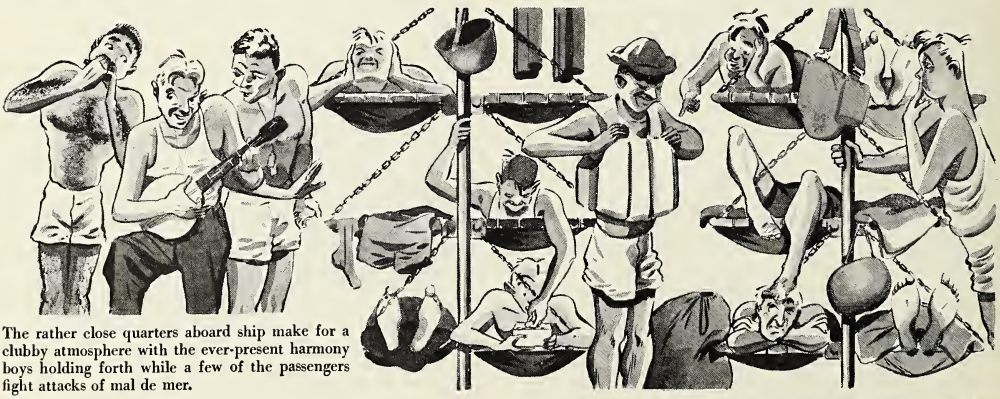
OVERSEAS MOVEMENT

By Lieut. Wm. T. Lent

In today's Army a man is always being shot or shot at. Immunization records must be completed before the unit departs for the staging area. In this case, Tail Gunner Simpson is more afraid of the medic's stiletto than he will be of the heavy flak over Berlin next month.

Corporal Newman is luxuriating to the fullest extent on his pre-overseas shipment furlough. He'll carry Sis' snapshot of this boudoir scene with him over there to buoy his spirits while sweating out a long chow line near a muddy field kitchen.

The movement from the staging area to the port of embarkation is generally accomplished with unbelievable smoothness and accurate timing. Private Willoughby proves the exception to the rule when the knot on his "A" bag slips as he walks up the gangplank.



The rather close quarters aboard ship make for a clubby atmosphere with the ever-present harmony boys holding forth while a few of the passengers fight attacks of mal de mer.

Wings for the Wounded

(Continued from Page 23)

Jenny—had been arranged to accommodate a special type of litter with patient.

Many improvements of plane No. 3131 were effected by enterprising flight surgeons and cooperating Air Corps officers during 1918 and 1919. During the years following the war, flight surgeons repeatedly urged the use of airplane ambulances by the armed services. Various planes were converted to carry one or two litter-type patients. Transportation of patients from airfields to general hospitals was encouraged throughout the Air Corps during this period, but, like many other developments within the armed services, there was much opposition to air evacuation as such.

At this time, the French again led in the development of the first airplane ambulance organization. A Major Epaulard in October, 1921, organized the first airplane ambulance squadron, consisting of six planes adapted to carry two or three litter patients. This unit saw duty during the French military operations of 1921 and 1922 in Morocco and the Levant. During the last six months of 1921, approximately 700 patients were evacuated by air. For comparison of figures only, it might be mentioned that during the month of August, 1943, a total of 927 patients were provided air evacuation along the ATC global routes. U. S. Marines in Nicaragua during the twenties found that air evacuation was not only the medical answer to the evacuation of wounded but also the best defense against ambush methods of the insurrectionists.

TODAY the organized air evacuation service of the Army Air Forces depends on cargo and transport planes—the C-46, C-47, C-54, C-75 and C-87—the same planes that carry equipment, medical supplies, gasoline, oil, food, jeeps, field artillery pieces, parachute troops and airborne troops to the forward areas. On their return from the fighting zones—whether within the theatres of operations or between the theatres and the States—these planes fly casualties to hospitals hundreds of miles from the din of the battle areas. A small number of O-49 planes, called the L-1A, have been converted to carry two litter patients for use at isolated stations. In certain island commands AAF task forces use PBY amphibian planes but this is the exception rather than the rule.

The future of air evacuation, both for military and civilian requirements, is limited only by the type of equipment available. The helicopter and the pick-up glider are in the development stage. However, staff members of the Aero-Medical Laboratory at Wright Field, as well as many other flight surgeons in the medical service of the Air Forces, are continuing research to effect constant improvements in air evacuation. Development of the present type of medical supplies, oxygen equipment and litter supports, now used throughout the air evacuation service, is the result of the combined efforts of the Aero-Medical Research Laboratory, the Troop Carrier Command, the AAF School of Air Evacuation and the School of Aviation Medicine.

The skill of American surgeons, the miracle of the new sulfa drugs and blood plasma are given a far better opportunity to effect their life-saving potentialities when the casualties are transported by air in the most comfortable and rapid means possible. The low fatality rates of this war bespeak in themselves what these combined efforts of the medical service have accomplished.

As to the morale value of air evacuation, the true answer can only be found in the patients who have endured the hardships of surface ambulances or hospital trains in the fighting zones, and have later been placed aboard an airplane to continue their trip to a hospital in the rear area. These patients are indeed the most enthusiastic advocates of air evacuation. ☆

What's Your AIR FORCE I.Q.?

Take a look at the ceiling, then take off on this month's AIR FORCE Quiz. Chalk up five points for each correct answer. A score of 90 or above is (as usual) excellent; 80 to 90, on the runway; 70 to 80, not bad; 60, fair; below 60, well. . . . Answers on Page 56.

1. Corsica is located
- a. *Between Sardinia and Sicily*
- b. *In the Adriatic*
- c. *Off the west coast of Turkey*
- d. *North of Sardinia*

2. The wingspread of the P-51 is approximately
- a. *43 feet*
- b. *31 feet*
- c. *37 feet*
- d. *28 feet*

3. If a pelorus is an instrument used by a navigator, Poloris is
- a. *The North Star*
- b. *An instrument used by a bombardier*
- c. *An island in the Solomon group*
- d. *The distance from the North pole to the South pole*

4. Headquarters, 6th Air Force is located in
- a. *Hawaii*
- b. *Alaska*
- c. *Greenland*
- d. *Panama*

5. "George" is the name sometimes given
- a. *The P-51*
- b. *The last plane in a bomber formation*
- c. *The automatic pilot*
- d. *A ground fog*

6. Army paratroops are
- a. *Members of a service branch of the AAF*
- b. *Members of the Caterpillar Club*
- c. *In the Ground and Service forces*
- d. *Members of the Troop Carrier Command*

7. If WAC is the abbreviation for Women's Army Corps, for what does the abbreviation WAVES stand?

8. Ellington Field is located in
- a. *Mississippi*
- b. *Florida*
- c. *Texas*
- d. *Illinois*

9. AAF planes have dropped bombs in combat with delayed-action fuzes set for as high as one hour.
- a. *True*
- b. *False*

10. Don't look now. What are the colors in the AAF shoulder patch?

11. The grade in the Navy equivalent to the Army staff sergeant is
- a. *2nd Class Petty Officer*
- b. *Seaman First Class*
- c. *3rd Class Petty Officer*
- d. *Seaman Second Class*

12. The horsepower developed by each engine of the B-17 is
- a. *900*
- b. *1,500*
- c. *1,200*
- d. *2,000*

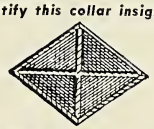
13. The official song of the Army Air Corps was written by
- a. *Irving Berlin*
- b. *Robert Crawford*
- c. *Maj. Gen. James Doolittle*
- d. *George M. Cohan*

14. A chaplain with the rank of major can properly be addressed as either Major Jones or Chaplain Jones.
- a. *True*
- b. *False*

15. Bomber crews with the 8th Air Force usually are grounded after
- a. *20 missions*
- b. *30 missions*
- c. *25 missions*
- d. *35 missions*

16. "Towing the sleeve" refers to
- a. *Pulling a target for aerial gunnery*
- b. *Coming out of the barracks half dressed*
- c. *Flying back with one engine gone*
- d. *A transport plane with a glider attached*

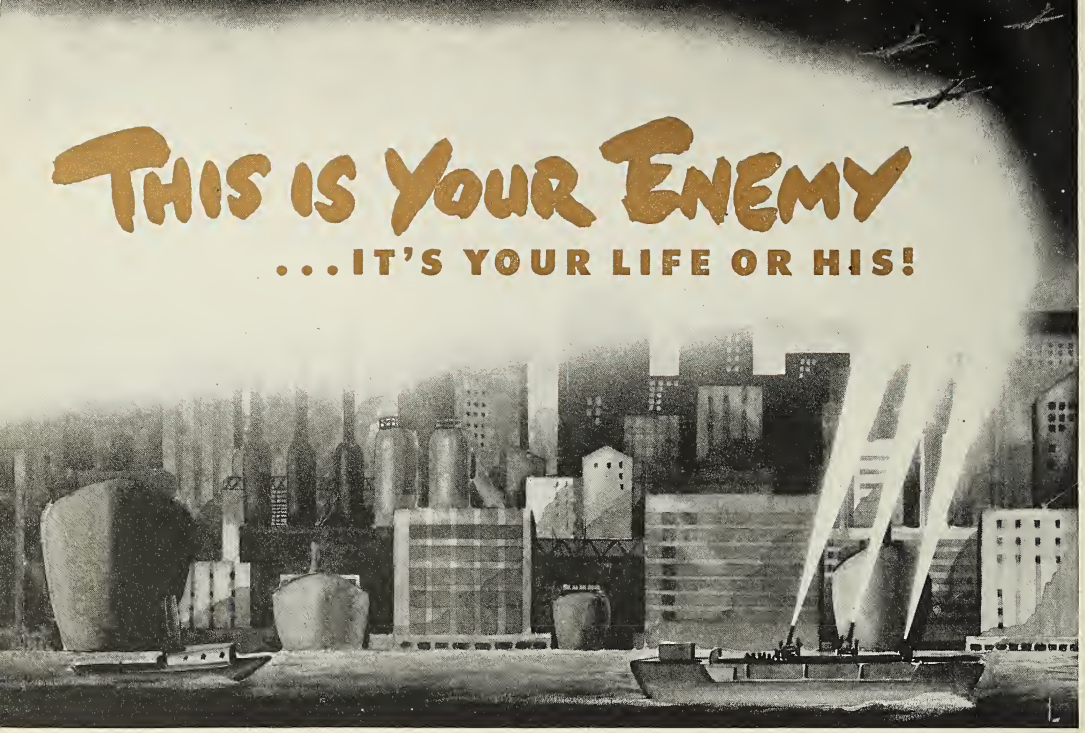
17. Identify this collar insignia:



18. The sump is
- a. *Part of an engine crankcase serving as a reservoir for lubricating oil*
- b. *Excess pressure at the bottom of a gas cell over the outside atmospheric pressure*
- c. *A positive-displacement reciprocating pump*
- d. *A Southerner's way of saying the sun has risen*

19. Latitude indicates distance from the equator
- a. *North or south*
- b. *East or west*
- c. *North or east*
- d. *South or east*

20. Only one of the planes listed below has twin engines and twin tails:
- a. *Beaufighter*
- b. *ME-110*
- c. *Hurricane*
- d. *ME-109*



Illustrated by Lieut. William T. Lent

THE Germans recently have increased their use of smoke screens as a measure of protection against the increasing fury of Allied air raids. Occasionally an entire area is blanketed with smoke, and at other times a ground haze is created to distort objects seen through it and thus become as effective as the full screen.

The screen is not actually smoke but a suspension in air of tiny, liquid particles sprayed by generators built on somewhat the same principle as a Flit gun. Weather, of course, affects the density of the screen. The best sort of a day for the Germans—and a bad one for us—is a highlv humid day with little or no wind.

The Germans have increased the volume of the smoke by increasing the number of generators in a single locality. A year ago only ten or twelve generators would be operated in one place; now as many as 350 are used. The Germans are using barges as bases from which to operate the generators used in protecting ports. Perhaps the Nazis are at least making some use of the barges with which they intended to invade Britain.

An unusual characteristic is that the screen tends to thin out as the target is struck by successive waves of bombers. Best explanation is that the percussions of the bomb explosions aid the natural dispersion of the screen.

APPRAISAL OF THE JAP. An S-2 officer from the South Pacific appraises the Jap in these words:

"The Jap racial characteristic of cunning is one that should be considered in definite distinction to intellectual strategy or thoughtful tactical deception. It is an innate quality, almost instinctive, a quality to be remembered because, like the small animals of the forest who can outwit their larger adversaries, the Jap is capable of inflicting damage and confusion upon him whose alertness lags, on him whom complacency has so far disarmed. However, in all contacts with him, by no means the superman of early nightmares, we shall continue to find that we have a persistent, industrious, audacious and diligent enemy; often unimaginative, but conditioned to hardships and scornful of suffering; an enemy whose conceivable advantage and definite 'capability' is his mental attitude and complete resignation to war. A fighter whose conception that his own civilization is spiritual, while contemptuously charging his opponents with materialism, carries into the fray a crusader spirit that is an enviable weapon in anyone's hands."

FAKE CITIES. The Germans repeatedly have built fake cities to lure our pilots away from Berlin. A forest outside Berlin was cut through with lanes so at night it might look like the Tiergarten Park. Then fake roofs of cloth and paper were placed in the area, and at night low lights were illuminated to make the location appear as a blacked-out city.

In their efforts to camouflage landmarks in another city, the Nazis drained a small lake near the harbor and built imitation houses on the lake bed. A wooden bridge was constructed to look like a noted bridge which, in turn, was disguised to resemble a boulevard complete to a replica of the town's most famous cafe.

It is reported that a large railway station, complete in every detail, was erected in a large field at another location. Very realistic, it even included dim, colored lights which at night looked like signal boxes. After raids, fires were lit to deceive airmen even further.

The Rumanians built a fake town near the Ploesti oil fields, equipping it to appear moderately lighted at night. It was the same size as the town of Ploesti and four miles away—in the opposite direction from the oil fields, of course.

RADIO PHONY. The pilot of a P-400 (Australian P-39) was on patrol when a message advised his flight of a change in the vector of the mission. The flight altered its course. But a smart controller at home

base had also heard the message which had been slipped in on the correct frequency by the Japs. He then checked the flight back to correct the trap the Japs had set. Now all controllers and flight or squadron leaders maintain frequent contact to prevent the Japs from vectoring our planes off course.

Pep Talk. An order of the day which Reichsmarshal Goering issued to German Air Force units in the Mediterranean area was captured recently. "Together with the fighter pilots in France, Norway and Russia, I can only regard you with contempt," Goering told his men. "I want an immediate improvement and expect that all pilots will show an improvement in fighting spirit. If this improvement is not forthcoming, flying personnel from the Kommodore downwards must expect to be reduced to the ranks and transferred to the Eastern Front to serve on the ground."

German Recognition Signals. The Nazis have used cloth strips, flags, felled trees and smoke candles as ground force recognition signals to their aircraft. Now and then, when lines were changing rapidly, the ground troops have been disciplined for forgetting to remove the cloth strips used to indicate a bomb line. These mistakes have been less frequent recently, inasmuch as company commanders are now held personally responsible for the cloth.

For a while, the Nazis used swastika flags to indicate their units, but they proved difficult to recognize from the air. Smoke candles are gaining more widespread use. In some instances groups of men, in danger of being attacked by one of their own planes, have been known to form a swastika on the ground and wave their handkerchiefs. At night these groups wave flashlights or torches.

Enemy airplanes have been known to signal ground troops with Very pistols, flares, rockets and smoke shells. The smoke shells have been used frequently to indicate Allied positions, tanks, artillery batteries or movements. German pilots, spotting an artillery battery have dropped blue smoke bombs over it so that their ground troops could observe its general location.

The Germans also have used an interesting flare system in some of their night bombing flights. A "pathfinder" would go ahead of the attacking planes to spot the target and drop a colored flare when he thought he had found the right place. Then another plane would drop illuminating flares, and the pathfinder would circle to make certain he was right. He would then signal the bombing planes to come in and unload.

Draw a Good Bead. A top turret gunner, with a record of 45 missions over Europe and Africa, makes this observation about German fighter tactics: "The Germans these days are not concerned with precision shooting against any one particular bomber. This lesson was learned the hard way. At first the Nazi came in fast and straight, and usually level at the tail. Their gunnery was deadly, but the Allied tail gunners were too good for that approach. The Nazi tactics changed rapidly, and our gunners were faced with the difficult target of speeding, rolling ME-109s. They'd come in from the back, with all guns of the six or more Messerschmitts shooting at the group of bombers.

"What can we do about that? Nothing except shoot straighter, faster and more accurately."

Left, Right, Left. At one time a favorite Nazi tactic in trying to break up formations of P-38s escorting bombers was to bring six or seven FW-190s directly over the P-38 formation from the rear and then split, four or more turning left and the remainder right. The fighters going left would attack the P-38 formation, and when the P-38s broke left, the enemy fighters on the right would move in on the exposed bomber flight. The P-38 commander retaliated by calling up his reserve flight, telling its pilots to break right, while the other flights went after the enemy on the left.

Tin Cans and Valises. Food tins have been left around by the retreating enemy for some Allied soldier to pick up or kick. Many of these tins are packed with explosives to kill everyone within a range of several feet. The Germans also "plant" carrying cases as mines, leaving them where curious troops are likely to pick them up for casual inspection or as souvenirs. They are usually charged with TNT and filled with nails, bolts, nuts and odd pieces of iron.

Under the Spreading Coconut. A striking example of Japanese sleight-of-hand and audacity has been reported by an S-2 officer with a heavy bombardment group in the Solomons. "In November, 1942, the Japs built a new landing field right under our very noses," he said. "This field on Munda Point gave the Japs very great potentialities and their presence was barely discernible at first.

"Always crafty in the use of camouflage, the Japs took full advantage of the webbing of coconut palms that lay like a giant net over much of their activity. The absence of day workers, trucking and other signs of construction was later explained by night reconnaissance which revealed the field literally crawling with workers — everything proceeding with startling animation under artificial illumination."

Shakespearean Stuff. Theatrical producers in Shakespeare's time used to save on the budget by marching some men across the stage, behind the backdrop, and across the stage again, giving the effect of a huge army. The Germans tried to work the same trick one recent night by moving trucks and tank units back and forth just behind the lines, trying to make things look as if they were getting reinforcements. When they retreated the next day, they left behind numerous dummy trucks made of cardboard.

The Next Outfit. During the Tunisian campaign, an anti-aircraft unit dug into a position on a hill. That night at dusk, some engineers in British and French uniforms came into the vicinity and started digging gun pits to the rear of the AA guns, while the AA crew watched with some interest. The next morning, the engineering units with their guns placed turned them on the AA unit and drove it out, taking over the abandoned equipment. The "French" and "British" were Germans. Moral: NEVER TRUST ANYONE YOU DO NOT KNOW—ALL UNKNOWN PERSONS, WHATEVER THEIR UNIFORMS, ARE TO BE SUSPECTED. ☆

LIGHTNINGS IN THE SKY

Written by a Radio Operator-Gunner on a B-17 in the African Theatre

Oh, Hedy Lamarr is a beautiful gal
And Madeline Carroll is, too;
But you'll find, if you query, a different theory
Amongst any bomber crew.
For the loveliest thing of which one could sing
(This side of the Heavenly Gates)
Is no blonde or brunette of the Hollywood set,
But an escort of P-38s.

Yes, in days that have passed, when the tables were massed
With glasses of Scotch or champagne,
It's quite true that the sight was a thing to delight
Us, intent upon feeling no pain.
But, no longer the same, nowadays in this game,
When we head north from Messina Straits,
Take the sparkling wine—every time just make mine
An escort of P-38s.

Byron, Shelley and Keats ran a dozen dead heats
Describing the view from the hills,
Of the valleys in May when the winds gently sway,
An army of bright daffodils.
Take the daffodils, Byron; the wild flowers, Shelley;
Yours is the myrtle, friend Keats.
Just reserve me those cuties, American Beauties,
An escort of P-38s.

Sure, we're braver than hell; on the ground, all is swell—
In the air it's a different story.
We sweat out our track through the fighters and flak;
We're willing to split up the glory.
Well, they wouldn't reject us, so Heaven protect us,
And, until all this shooting abates,
Give us courage to fight 'em—and one other small item—
An escort of P-38s.

OUR DEVELOPMENTS IN FIREPOWER

(Continued from page 18)

to design, perfect and install these turrets in mock-ups long before the big plane took to the sky. Thus, contrary to popular belief, American designers were studying the effectiveness of mechanically controlled turrets some time before the war.

Types of armament are determined by the tactical use to be made of the airplane. For instance, in the case of a night fighter where the normal technique requires approach on the target from a certain direction, the fire control equipment must be so designed that the maximum firepower can be obtained in that direction. The sight operator's position must be located to permit maximum visibility in scanning and sighting. In the case of the night fighter, development of a sight that allows greater passage of light through the optical system may be required.

One night fighter developmental design has a multiple-gun turret. For several months in our laboratory we tested the turrets in special mock-ups before the completed airplane was brought to Wright Field. The plane's upper turret fairly bristles with guns, resembling an infantry pill box.

In the past, the main function of the armament laboratory was to develop new aircraft armament items. In addition to this development work, much of the effort of this laboratory — and of the Engineering Division—is directed toward the modification of combat equipment to replace one type of standard equipment with another type, depending on the tactical use of the aircraft. Other developments engineered by the armament laboratory may not be for specific application, but for insurance against the day they are needed. Some of our newest gadgets are put on the shelf to await the time when they can be used most effectively.

Up to the present time, armament for fighter aircraft has varied only in caliber of guns. However, with the stepped-up tempo of enemy fighter activity, the requirement for a fixed gun installation that will provide automatic corrections for lead, range, altitudes and speeds is becoming more apparent. This subject now is being investigated and development articles are being tested to ascertain their suitability. A great amount of development work also is being accomplished on new improved types of fighter gunsights. These include sights for night fighting purposes, extension of present sighting ranges, combination gunsights and dive bombsights.

That the firepower job is being well done is evidenced by the tallies which our airmen are scoring in combat against the enemy, by the number of Jap and German planes falling in combat, and the ever-increasing pounding of enemy cities by our big bombing planes.

Literally, we are designing guns and putting wings on them. ☆

MISTAKES IN 'ON THE LINE' PICTURE ON PAGE 40

(READING FROM LEFT TO RIGHT)

1. Get your foot off the crank handle, Corporal! It's no foot rest. The engine is apt to turn over if inertia is engaged. Incidentally, that crank shouldn't be there. Also, move your left foot off the coolant hose. Reference: Common sense and TO 04-5-12.

2. It's feet first in this picture, but they're in the wrong place. You there, removing the electrical connection on the magneto. Don't stand on the cowl former because your weight will break the part, the cowling won't fit and the former will have to be replaced. Reference: Good shop practice.

3. That screwdriver stuck in the manifold foreshadows a great hazard. If it falls down between the "V" of the engine, and stays there, you can't tell what might happen.

4. Ouch! Dual boner from you seated on the maintenance stand. First, take your foot off that piece of cowling. You'll mash it so it won't fit. Secondly, nix on using that long extension handle to install spark plugs. It will cause pulled or stripped spark plug bushings. Use the proper torque wrench and refer to TO 03-5E-1.

5. Now, Corporal, you know better than to take the prestone coolant cap off with a screwdriver and hammer! A strap wrench is used. Reference: TO 01-75FB-2. And your left foot—keep it off the prop shaft or you'll damage the splines. Reference: Good old horse sense.

6. And say, come to think of it, are you the famous man from the flying trapeze? We're wondering just how you landed there anyway, which gets us around to the boner of the crew chief stand not being under the prop shaft.

Answers to Quiz on Page 53

1. (d) North of Sardinia.
2. (c) Approximately 37 feet.
3. (a) The North Star.
4. (d) Panama.
5. (c) The automatic pilot.
6. (c) Ground and Service forces.
7. Women Appointed for Volunteer Emergency Service.
8. (c) Texas.
9. (a) True. For example, in the August attack on the Ploesti oil refineries.
10. Gold, Blue, Red and White.
11. (a) 2nd Class Petty Officer.
12. (c) 1,200.
13. (b) Robert Crawford.
14. (a) True.
15. (c) 25 missions.
16. (a) Pulling a target for aerial gunnery.
17. Finance Department.
18. (a) Part of an engine crankcase serving as a reservoir for lubricating oil.
19. (a) North or south.
20. (b) ME-110.

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